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ABSTRACT

This journal issue focuses on the frequency spectrum used in radio communication and on the World Administrative Radio Conference, sponsored by the International Telecommunication Union, held in Geneva, Switzerland, in the fall of 1979. Articles describe the World Administrative Radio Conference as the most important radio communication conference to be held in 20 years, whose purpose was to bring up to date the international regulations applicable to all radio communication services, and whose decisions have the force of a treaty. Other articles explain the frequency spectrum, discuss its management, and outline some of the issues discussed at the conference. Additionally, there are articles on videotex, home video, the use of satellites, and other areas of telecommunication. (MKM)

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THE FREQUENCY SPECTRUM RADIO

John Howkins
Editor

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Hot competition for home video

The market competition between domestic video cassette machines will intensity this autumn when Philips launches its new V2000 series. The new machines, demonstrated in Eindhoven in June, have several advantages over the VHS and Betamax formats. The mechanics are better and the electronics also compare well.

The arrival of the V2000 will push the home video business, which the Japanese were claiming this spring had established some kind of equilibrium, into further uncertainty. The dominant market position of Japan's new VHS and Beta formats looked as if they had easily defeated the older, more traditional and rather more cumbersome European VCR. Philips (and Grundig, under licence) had greatly improved their VCR, but the tide seemed to have turned in favour of the new generation.

The V2000, clearly a superior format in operation and quality, changes that situation. Indeed, Philips, whose audio cassette set worldwide standards for everyone, are claiming that their new video cassette has the best chance among the competition of repeating the trick.

It certainly has many facilities which enable users to record and replay much more easily than with the VHS or Betamax. On the first consumer model, named V2020, up to five separate recordings can be pre-selected in a single operation, and they can range over five channels and the next 16 days. The electronic counter automatically goes to zero at the beginning of each tape, and a particular place on the tape can be quickly found by setting the required number on the counter. In a 'search' mode, the tape passes at about 12 times normal playing time, and the picture, although not clear, is recognisable. A microprocessor allows each operation to be started by a single button (eg, one 'record' button instead of 'play' and 'record', as now) and it is possible to go directly from, say, 'record' to 'eject'.

The major innovation is the new tape and tape transport. The tape is stacked on two side-by-side reels, as in Philips' now-standard audio cassette and other video cassettes, and not on two reels concentrically placed on top of each other, as in Philips' earlier VCR series. More important, like Philips' audio cassette (but unlike any other video cassette) the V2000 tape is turned over at the end of its first track and played again on another track. This arrangement allows Philips to get a maximum of eight hours (four on each track) on a single cassette.

The V2020 has clear advantages over Philips' earlier, pioneer VCR and its, and Grundig's, later VCR-LP and SVR versions. The VCR, which is the oldest and best-established video cassette machine (if not the best seller, because of its failure to penetrate the NTSC market of Japan and the USA) lasted about five years.

The user will soon thus be faced with three completely different systems: Philips V2020; Matsushita's VHS machine, which is licensed to many manufacturers, and is the current leader; and Sony's Betamax, also licensed. The multiplicity of machines would be healthy – in both technological and economic terms – were it not that each format's cassette and leader, heads, etc, is utterly incompatible.

The lack of a standard does not worry many people at the moment. Most users record off-air, exploiting their machine's facility for time-lapse recording, and play back the cassette on the same machine. It is irrelevant whether other people have similar machines, or not.

But it does matter, in two important ways. One, producers of pre-recorded cassettes (currently a very small business) find it difficult to have large runs, and therefore have to charge more. Two, as long as the industry feels it can introduce new formats, the user will find every few years that his collection of tapes is unusable.

Meanwhile, the V2020 series should be very attractive to all users, even those who currently have another format. The two tracks mean that its tape costs (a vital factor) are already as low as £3 per hour, with the possibility of even cheaper rates in the near future. And the machine itself is likely to be only slightly more expensive than its rivals.

But the domestic market is far from settled. Other machines are promised, with very different specifications. Toshiba, for instance, have announced (although not yet demonstrated) a machine whose tape has 220 parallel tracks, scanned longitudinally. The benefits are the machines' small size and very low cost (say £300).

The introduction of the video disc in substantial quantities will change existing patterns of use and consumption even more markedly. That time looks like starting in Christmas 1980, although the more sanguine say Christmas 1981.

Certainly, MCA/Philips, the current disc leader, is happy to wait a bit, while it concludes some very profitable deals with the industrial version of the machine (5,000 sold to General Motors, for instance). RCA and JVC, who are developing a capacitance version (against Philips' optical system) would also like more time for development, although RCA could start selling this year (and have said they will). The JVC disc is not so advanced.

So for the next few years the richer people of the West, while enjoying the benefits of the first generally available cassette machines, are basically going to be acting as guinea pigs in a massive trial of home video. By the mid-eighties (in five years) machines of this year's range of VHS, Betamax and V2020, howsoever satisfactory, will probably be rarities. Akio Morita, chairman of Sony, said in July that he expects a proliferation of cassette standards; planned obsolescence, he said, was 'the nature of our business'. Philips clearly hope their V2000 series will prove him wrong.

FRANCE: *Integrated videotex*

The various French videotex systems are gradually emerging as a very interesting range of different but integrated new services. The work done by the telecommunication authority, the broadcasting authority and several research institutes is producing an overall range which may well be more useful than some developments in other countries.

The interactive Teletel service, the broadcast Antiope service, and several other services will be combined at several different levels. The aim is to provide a wholly integrated matrix of services.

France's recent progress in telecommunication is something entirely novel. As Norbert Ségard, Secretary of State for Posts and Telecommunications, said recently, 'who would have believed only five years ago that in 1979 it would be possible to speak of telephone growth à la française in the world of telecommunication? In 1974 the French telecommunication network was still relatively underdeveloped and lagged far behind the networks of our main foreign partners.'

In 1974, however, the government decided the improvement of the country's telecommunications' network should be a national priority. It allocated £14,000 million to a five year programme of research and investment. In 1978 President Giscard d'Estaing and his cabinet officially adopted the word 'télématique (from 'télécommunications, itself originally a French term, and 'informatique') to symbolise their new concerns.

Their first aim was to improve the public switched network. A better basic network allows not only better telephone, telex, etc, services but also the more efficient development of videotex, facsimile, the Transpac data network and other new services. Also, the French PTT is planning to launch (on its own Ariane rocket) a Telecom 1 national communications satellite. Telecom 1 will probably be Europe's first national telecommunications satellite. It is scheduled to become operational in mid-1983.

The French attack, over a very wide front, on all aspects of the 'informatisation of society', has resulted in its Teletel videotex service being conceived in quite different ways to other national systems. The most obvious difference is in the plans for the provision of Teletel terminals.

The PTT's Direction Général des Télécommunications is developing a special Teletel set, which will be totally independent of the ordinary TV receiver. The Teletel set measures about 8 inches diagonally across the screen. The terminal and keyboard can be built for about £50.

In 1981 the DGT will install Teletel terminals free in the homes of all telephone subscribers in the department of Ille-et-Vilaine, and thereafter, also free, in the whole of France. The DGT hopes to cover all 30 million telephone homes by 1992.

A trial will be held next year in Vélizy, near Paris. About 2,000 homes will participate. Initially, Teletel's basic service will be an electronic directory service.

The printed telephone directories will be replaced by electronic data banks, accessed through Teletel. Many other services will be provided. The official citizen's guide on rights will be computerised so that it can be consulted at home. The SNCF trains will be able to be booked through Teletel. Several banks will provide electronic statements of accounts and transactions, and arrange electronic payments (three banks will be ready to do so for the Vélizy trial). Several mail order companies will provide a mail order service. Also, the DGT will provide a message service.

The offer of a free terminal will clearly be a great factor in Teletel's success. The delays of Prestel (the UK interactive videotex service, which has been postponed several times) can largely be blamed on the manufacturers' reluctance to produce a Prestel set at a reasonable price.

They cannot do so, they claim very reasonably, until Prestel's activity would guarantee a large market and, therefore, low prices. Yet an active market, everyone acknowledges, depends upon many people having sets. The UK manufacturers would be overjoyed if the British government made a commitment, as has the French, to order and instal a few million sets.

Secondly, the Teletel set is designed to be capable of receiving not only conventional Teletel material but also the whole range of other new services. The ones most often mentioned are teletex (high speed telex) and facsimile. It can also be used for data processing.

FRANCE: *Sponsored programmes*

The second French TV channel, Antenne 2, is to broadcast sponsored shows during the morning. The network (one of three in the country) is normally closed until noon. Under the new arrangements, already approved by Antenne 2's board of directors, a series of 'service' programmes would be transmitted.

The programmes would be produced for companies, organisations, private groups and government departments. Each programme would be aimed at a specific audience (say, the shareholders of a company), although it would be transmitted by Antenne 2 in the normal way and so could be watched by the ordinary viewer.

The number of people who might use the service is virtually unlimited. As well as companies talking to shareholders, a marketing organisation might want to promote a product amongst retailers, a manufacturer might want to announce a new range of goods, a public agency might want to deliver a film on industrial safety, and so on.

The scheduling and financial arrangements will be done by a new company called Television Communication Service (TVCS). Its owners include Mediavision, a major production company, Hachette, Havas, and Societe Generale, a bank. President of TVCS is Jean Marin, formerly head of Agence France Presse.

The Antenne 2 scheme appears to be unique. Nowhere else has a broadcasting organisation which normally operates under strict control for advertising content and volume (as do all the French networks) opened its closed period to sponsored shows. Other sponsored networks either use private channels (like the US video cassette networks) or are strictly controlled.

There was a plan to use the UK's fourth channel partly for this purpose, under an Open Broadcasting Authority, but the channel is now going to be run by the IBA and ITV companies. In France, too, discussions for sponsored 'service' programmes have been held for some years, before the idea was finally accepted.

USA: *Rapid expansion of satellites*

The re-write of the US Communications Act may be dead (see *Short Notes*, page 5), but the new technologies that made the re-write desirable are developing ever more rapidly. This autumn, the number of US domestic satellite operations will practically double and several decisions by the Federal Communications Commission and manufacturers point towards expansion at a similarly rapid pace for the next twelve months.

The main reason for the new sense of excitement is the increasing use of satellites to deliver television to cable systems. Satellites are giving cable its biggest boost for years. About 1,650 cable operators have bought their own satellite receiver. The USA now has three domestic satellite systems. Western Union (whose third satellite was launched in August) has Westar, RCA has Satcom (two, so far) and AT&T and GTE have Comstar.

Until recently AT&T's Comstar satellites were not allowed, by FCC regulation, to carry video. The FCC had placed on it a three-year moratorium to prevent AT&T, which dominates terrestrial transmission, from having a privileged position. But the moratorium expired on 23 July. As a result, Comstar's transponders are available to distribute video. Westar 3 (as well as 1 and 2) will also be used to distribute video. And RCA will launch Satcom 3 in December.

The increase in the hours of video has been enormous. At the Televisa World Encounter on Communications, Howard Crispin, Vice-President of Scientific Atlanta (a major manufacturer of satellite antenna) said that in 1979 satellites have so far distributed (mostly via Satcom) 10,000 more movies, 2,000 more sports events, 6,000 more hours of children's programmes, two 24-hour news services, several more religious programmes, the Spanish International Network and coverage of the House of Representatives.

In addition the schedules of several stations are being picked up by satellite operators and distributed to cable systems across the country. Next June, WTCG (the first of these super-stations) will start its own satellite-and-cable news service, called Cable News Network. It will include an evening news programme, lasting two hours from 5pm to 7pm.

The ABC, CBS and NBC commercial TV networks have not yet used satellites to distribute their regular schedules (although their news division use them frequently for sending electronic signals and news film to the studio). They have remained loyal to AT&T's land lines. But NBC is talking to Western Union and RCA, and to AT&T, about satellite transmission and it is almost certain that all three networks will be using satellites in a few years. Public television has been using Westar for programme distribution for some time, and public radio will transfer to satellites in October.

The industry is looking carefully at the agreement between the Westinghouse Broadcasting Company and Western Union. The agreement allows Westinghouse to link its Group W stations by means of WU's Westar. The Group W stations are all affiliated to one of the networks, but they also form a unified and powerful grouping. Westar's satellite interconnection, linking the five stations, the Group W news office in Washington, and its production company, turns Westinghouse, primarily a syndicator, into something quite different and potentially more powerful.

In August, indeed, Comsat General announced a tentative plan for using satellites for subscription television (ie, over-the-air pay-TV) direct to homes by 1983.

At present, these satellites and services are categorised by the International Telecommunication Union and US domestic agencies as Fixed Satellite Services (FSS). They transmit from one fixed point to another; and their signals are re-transmitted by a terrestrial network, either over-the-air or by cable, before being received by the public. However, several companies (including Radio Shack which, in spite of its name, is one of the biggest US companies in retail electronics) are developing new strategies for marketing very cheap, small terminals for direct reception.

For a few years, at least, these terminals will probably not be cheap enough for individual households (except those of the extravagantly rich). But they might be within the grasp of small groups and associations, who would use them to receive their satellite pictures direct.

In ITU parlance, this level of service would rate as a Broadcast Satellite Service (BSS). The definition of a BSS is actually a service 'in which signals transmitted or re-transmitted by space stations [ie, a satellite or space platform] are intended for direct reception by the general public.' At the ITU's 1971 space conference the term 'direct reception' was agreed to 'encompass both individual reception and community reception.' Question is, when is the link from the satellite receiver to the display on a TV set a direct link, and when is it a re-transmission? When does a hotel (using FSS) become a community (using BSS)?

The distinction is important. A satellite in the fixed service (eg, the US domsats, the Intelsat satellites, Canada's Anik and Telesat) is allocated one range of frequencies while satellites in the broadcast service are allocated entirely different frequencies. A satellite in one service cannot provide signals in the other service.

During the summer, both satellite and cable operators worried about more immediate matters. Their main talking point was the shortage of satellite antennae. RCA's allocation of transponders on Satcom 3, scheduled for a December launch, frustrated many customers. Satcom 1 has been the cable operators' favourite satellite and many applied for a transponder on Satcom 3. Most were disappointed – only four transponders were made available. One operator, the Spanish International Network (SIN), has officially complained to the FCC about the allocation.

There is an even greater shortage of material. Cable systems are voracious for all kinds of films and programmes. The production companies cannot produce enough material, especially at the very low prices the cable companies have managed to pay in the past. Every possible source is being searched for new, or old, material.

These short-term problems are likely to be solved in the market-place, although not without major shifts in the pattern of US television. The issue of direct and broadcast services requires more complicated, international regulation. But there's no doubt the pace of development has speeded up, and shows no sign of stopping.

Germany: Draft law for videotex

A special law for videotex has been proposed by the Land (state government) of Nordrhein-Westfalen in West Germany. The Land has a special interest in videotex since one of the first trials of the German interactive system (based on the UK Prestel system) will take place in 2,000 households in Dusseldorf and Neuss, one of its largest cities.

The bill was drafted to ensure 'equal' chances for all participants. It says that irrespective of whether videotex is broadcasting (which the nine Land control) or some new medium (which the federal government would probably control) it is necessary to establish preliminary legal arrangements about access, fairness, etc.

The main provisions are based on existing regulations for the written press. Information Providers ('Anbieter teilnehmen') have to have a licence, as do publishers, and have to be free of certain financial or legal commitments.

All pages must show the name and address of the Information Provider (on Prestel, only the name is shown). News must be truthful, factual and impartial, and must be shown separately from opinion. Advertising is to be permitted, but advertisements must be kept separate from other information.

A right of reply, similar to that in the Press Law, is also included. The Information Provider must display the reply without any additional cost to the user.

Offences can be punished with a fine up to DM 10,000. The ultimate judge in such matters is the president ('Regierungsprasident') of Dusseldorf, who will grant the licences to Information Providers, and who has right to revoke them.

Radical changes in US public broadcasting

US public broadcasting is changing radically after the adoption by the Public Broadcasting Service (PBS) of a new structure of management and distribution. The re-organisation has been planned for over a year. It was adopted finally at the PBS annual meeting in July.

The new PBS will concentrate more on programme distribution. It will lose much of its previous responsibilities for peripheral support and representation. It will be a distributor, not a trade association.

It will provide one basic, high-quality programme service (called the blue service); one countrywide regional service (the red service); and a 'home and school' service (the green service). The red and green services will operate jointly for the time being, and split in 1981. More services will be added in the future. The next one could be instructional.

A major issue has been the relative authority of the president (current Lawrence Grossman) and the board. At their annual meeting the stations clearly preferred a strong executive and a smaller board. The size of the board, now 52, will be reduced to probably 36 people.

A separate Public Television Center for Planning and Policy will take over some of PBS's responsibilities for planning, coordination and representation. Most of the changes will take effect from 1 January 1980.

Israel: Director's contract is terminated

The Israeli Broadcasting Authority has voted not to renew the contract of its director of television, Arnon Zuckerman. The IBA's director general, Yosef Lapid, has temporarily taken over the director's responsibilities.

The decision was highly controversial. The ruling Likud bloc in parliament are generally supporting Mr Lapid, while many of the station's staff are supporting Mr Zuckerman.

USA: Re-write loses support

The radical re-writing of the US Communications Act sought by Lionel Van Deerlin, chairman of the House Sub-Committee on Communications, collapsed over the summer in the face of hostility both from the broadcasters and from lobbyists and spokesmen of public interest groups. Mr Van Deerlin finally lost the support of his committee members and decided to jettison his brand-new bill and to introduce a new, gentler reform.

The original bill had had widespread support, but it also had powerful enemies. Both broadcasters and lobbyists disliked the prospects of radical changes to the familiar business. In addition, the broadcasters were implacably opposed to the proposed 'spectrum fee'.

The new bill is tentatively titled Telecommunications Facilities and Services Act, 1979. Its thrust is the principle of the 'common carrier'. First drafts are reckoned to be favourable to cable.

More criticism of French broadcasting

Some harsh criticism of the government's use of the broadcasting monopoly during elections, by François Mitterand, leader of the opposition, and ten colleagues, has led to legal proceedings against the critics. The reason was that they voiced their remarks on a pirate radio station, in Paris and Montpellier. They were charged in August for having taken part in an illegal broadcast.

More formal criticisms have been made by a commission of inquiry into the broadcasting system which was established by the Senate in January. It has strongly criticised the Société Française de Production (SFP), the production company, and three networks, especially for inefficient administration and financial activities. It suggests a state body should be set up, to control and coordinate all the seven companies that replaced ORTF in 1974 and that have, the commission says, proved to be unworkable.

UK Centre for Social Concern Broadcasting

A UK Centre for Social Concern Broadcasting has been proposed by an independent steering committee of broadcasters, social agencies, and others. The centre would cater for people involved in social concern broadcasting, a fairly new but expanding category of programmes which includes *Reports Action* (Granada), *Action Line* (Ulster), *Grapevine* (BBC) and *Time to Spare* (BBC Radio Leicester). The programmes aim to generate interest in social and community agencies, and to assist people to give support, or to take action themselves.

The centre would provide information, training, and research. It would require over £100,000 a year for the first three years.

West German monopoly is challenged

A major West German broadcasting organisation has received a second warning that it may lose its monopoly. The contract between Norddeutscher Rundfunk (NDR) and Lower Saxony, Schleswig-Holstein and Hamburg city is now most unlikely to be renewed after 1980.

The Prime Minister of Lower Saxony has said that NDR should relinquish one TV channel and two radio channels in favour of other operators. A new organisation, called Lower Saxony Radio, may be set up to produce and schedule programmes on channels that have hitherto been used by NDR.

NDR is one of the largest of the country's nine regional broadcasting organisations. Its problems revolve around two issues. One, content and transmission are biased towards Hamburg. Two, the increasing politicisation of West German broadcasting. The Prime Ministers of Lower Saxony and Schleswig-Holstein are both CDU, and have major political differences with Hamburg.

Tanzania says 'no' to television

The mainland of Tanzania will not have its own TV service 'in any near future', according to Isaac Septu, Minister of Information and Broadcasting. Mr Septu said recently that the government appreciated the important role that TV could play in the country's economic development through mass education and emancipation. But the country was too poor to launch a TV service at the moment. He added that TV would benefit only the privileged few, and not the masses.

Tanzania's reluctance to get heavily involved in TV partly reflects its experiences in Zanzibar and Pemba (the small islands which have 4% of Tanzania's population). Zanzibar installed TV in 1973. The service was in full colour, the first in black Africa. It has been much more expensive than expected, and not so satisfying.

Moves against Yugoslavia's pirate stations

The Yugoslavian government has taken strong action in the past few months against the country's many private radio stations. All private broadcasting in Yugoslavia is illegal under the current law.

The pirate stations have flourished for many years, however, and government estimates put the total of transmitters as high as over 1,000. Even after the latest round of government intervention, the number may be as high as 100.

Most of the pirate stations use the medium wave to broadcast a mixture of news and political information, with some community and entertainment material. The pirate stations were much more similar to the official state stations than is normal in other countries.

Although all private broadcasting is illegal the Federal Committee for Information, which is responsible for enforcing the law, had been lenient for many years. What provoked the federal authorities to act was the growing number of pirates and, especially, the actions of a few stations that the government has described as irresponsible. For instance, some stations had broadcast warnings of earthquakes, and suggested people should leave their homes, although no earthquakes were expected. Also, some of the stations' signals were said to interfere with shipping and emergency services.

FUTURE MEETINGS

New technologies and publishing

A symposium on the Impact of New Technologies on Publishing will be held on 6-7 November 1979 at the Jean Monnet Building, Commission of the European Communities, Luxembourg. It will review new technologies and discuss appropriate policies. Details from J.M. Gibb, DG XIII, Commission of the European Communities, PO Box 1907, Luxembourg.

Videotex for professionals

The Professional Viewdata Exhibition, a specialist exhibition of videotex equipment, will be held on 7-8 November 1978 at the West Centre Hotel, Lillie Road, London. It is organised by *Viewdata and TV User* magazine. Details from the Manager, Room 821, Dorset House, Stamford Street, London SE1, UK.

New York Television Festival

The first New York World Television Festival will start on 9 November 1979 in the McGraw-Hill Auditorium, New York. The idea for the festival originated from John Grist, BBC representative in New York. Screenings and discussions will run for three weeks. Details from Angelica Morse, Executive Director, New York World Television Festival, c/o BBC, 630 Fifth Avenue, New York, NY 10020, USA.

ICA in 1980

The 30th International Conference of the International Communication Association (ICA) will be held on 18-23 May 1980 in Acapulco, Mexico. It is sponsored by the ICA and the Mexican government. The theme is Human Evolution and Development. Details from Everett Rogers, ICA President-Elect, Institute for Communication Research, Stanford University, Stanford, California 94305, USA.

IBC in 1980

The 8th International Broadcasting Convention will be held on 20-24 September 1980 at the Metropole Centre, Brighton, UK (after the Grosvenor House Hotel and the Wembley Conference Centre proved, in 1976 and 1978 respectively, to be too small). Details from IBC Secretariat, Institution of Electrical Engineers, Savoy Place, London WC2, UK.

A decisive conference

Rodrigo Carazo, President, Costa Rica

The world conference in radio communications to be held during the next few months is absolutely decisive. The reason is quite simple: the word and the image constitute in the fundamental development of nations the essential instruments of communication and of the integration of the individual. The spoken word and the image reflect the spirit of man.

It is a grave error to pretend that the WARC should deal with only technical or administrative matters. Whether we like it or not, the conference is essentially a political one. Its resolutions will greatly affect the whole of mankind, relocate the balance of power and, as a consequence, impinge upon the sovereignty of every nation.

The interest in the WARC is universal, not because of the novelty involved in the new technology, but because communications now deals with the essential nature of man. Years ago, progress was measured by, among other things, the production of tons of steel. Nowadays, communications is the best measure of progress.

The old principle of 'first come, first served' is the expression of the most primitive order. It is not fair that the industrialised countries, with 10% of the world's population, should control 90% of the spectrum. One should consider the close relationship between progress and communication.

I am not talking about an ideological conflict. I am talking about the old topic of the distribution and concentration of power. The just distribution of this power is not only a political matter but also a technical, economic and social matter.

As we are only a few days from the beginning of the conference, it would perhaps be difficult to adapt earlier decisions so that justice might prevail in this meeting. However, it is never too late to suggest a few new ones:

1. A general debate should take place at the beginning of the conference, with the purpose of reaching a consensus on the principles which are to decide the technical options.

2. The conference should then hold several separate sessions over several years (as did the conference on the law of the sea; and as will the ITU's own conference on MF broadcasting in region 2, which will hold two separate sessions in 1980 and 1981). The session of the WARC taking place in 1979 could be for the general debate and for the explanation of the position of each delegation. The one taking place in 1980 could search for a common policy for the benefit of mankind, and the last one in 1981 could be for reaching final agreements.

3. During the conference, a democratic operating mechanism should be adopted. The working rules should guarantee this principle.

4. Developing countries should establish a mechanism for consultation and coordination.

5. The United Nations should hold a World Conference on Communications by 1985.

My government has decided to speak both for itself and closely together with other countries which share the same interests and ideals. As I said above, communications play a prime role not only in the present but also in the future: that is to say, in our destiny.

Focus on Geneva

M. Mili, Secretary General, ITU

September 1979 will see two ITU major events: the third World Telecommunication Exhibition, Telecom 79, held in Geneva from 20-26 September, and the opening of the World Administrative Radio Conference on 24 September for a 10-week duration. These two events will mobilise the world of communications and will concentrate in Geneva all those who are responsible for the future of telecommunications development.

The World Administrative Radio Conference (WARC) is the most important radiocommunications conference to be held for twenty years. Its ten weeks will be decisive for the future of telecommunications.

The purpose of the WARC is to revise, harmonise and bring up to date the international regulations applicable to all radio communication services. It is a governmental conference whose decisions have the force of a treaty.

The international legislation governing telecommunications, established and approved by the 154 member countries of the ITU, comprises the International Telecommunication Convention, a treaty which sets out the structure and modus operandi of the ITU. This convention is supplemented by Administrative Regulations which govern the use of telecommunications and are binding on all members of the ITU; the Telegraph Regulations; the Telephone Regulations; the Radio Regulations, which deal with the use of the frequency spectrum, the use of the geostationary orbit, conditions for the operation of radio stations and the relevant administrative provisions; and the additional Radio Regulations, which deal with questions relating to traffic and charges in the aeronautical mobile service and the maritime mobile service. It is the two last bodies of Regulations which will be reviewed to a large extent by the conference beginning on 24 September.

The last conference with a comparable mandate was held in Geneva in 1959. Since that time, specialised world conferences have met to take account of new technical developments and new frequency requirements for each particular radio service: the service using space techniques, the maritime mobile, aeronautical mobile sound and television broadcasting and direct satellite broadcasting services.

The international regulations revised by the WARC will in all likelihood remain in force until the year 2000 and perhaps even longer. In other words, they will have a considerable influence on the development of all types of telecommunications in the 21st century.

Origins of the conference

The decision to convene a general world administrative radio conference was taken at the ITU's tenth Plenipotentiary Conference (Malaga-Torremolinos, 1973). In resolution number 28, the conference decided to hold a WARC in 1979.

Many members of the ITU have set up national governmental coordination committees grouping the various users of radio communications to prepare proposals for submission to the conference. Numerous bilateral and multilateral discussions have also been held by member countries to coordinate their proposals as far as possible. Many of these proposals have already been received at ITU headquarters; they may only be submitted by members of the union. They are currently expected to amount to more than 3,500 typed pages by the eve of the conference.

In addition, a number of national or international

organisations concerned with radiocommunications, such as the International Institute of Communications, have already held or will hold meetings to discuss preparations for WARC.

The ITU's permanent organs have taken the necessary steps to create the best possible conditions for the preparation of the conference. The Administrative Council has taken adequate measures to ensure its administrative and technical preparation.

Furthermore, the union's three technical permanent organs have conducted an intensive preparatory work. Technical preparation is one of the statutory functions of the International Frequency Registration Board (IFRB) within the framework of its essential duties defined in the International Telecommunication Convention. In the course of its activity and daily application of the Radio Regulations, the IFRB has responded to a number of requests from member countries for comments on the anomalies, discrepancies and difficulties encountered in the application of the Radio Regulations. These comments have been assembled and communicated to the telecommunication authorities of each member of the union for use in its preparation for the work of the conference. The IFRB also studies the substance of the formal proposals to the conference (which are published in advance) and identifies the widest areas of agreement on special items.

The national delegations to ITU conferences are designated by the members of the union. Also entitled to attend are observers from the United Nations, regional telecommunication organisations, specialised agencies of the United Nations and from the International Atomic Energy Agency, and accredited international organisations; as well as representatives of private operating agencies authorised by the member country to which they belong. About 1,500 delegates from some 140 member countries of the ITU are expected.

Telecom 79

A world exhibition held under the auspices of a United Nations organisation does not pass unnoticed, since such undertakings are not very common. Yet what makes every Telecom a real event is that it is indeed a new type of exhibition, permitting visitors to go around the telecommunication world in seven days.

It was in 1971 that the first World Telecommunication Exhibition, Telecom 71, was held in connection with the 2nd ITU World Radio Conference for Space Telecommunications, convened to bring up to date the international regulations governing space radiocommunications. Telecom 71 gave the attending delegations an opportunity of viewing the world of existing telecommunication equipment in a few days. Above all, the presence of national pavilions of developing countries enabled delegations to become aware of those countries, and their telecommunications projects and requirements; to make economic and technical evaluations; and to engage in productive negotiations. The trend that was evident at Telecom 71 emerged even more strongly four years later at Telecom 75. Telecom exhibitions are really the world crossroads of telecommunications.

The demand for the equipments and systems produced by the telecommunications and electronics industry is constantly growing. One example is the development of the telephone, that basic instrument of telecommunication, of which there were 41 million in 1945, 195 million in 1966 and 400 million in 1977. According to certain forecasts, the figure of 720 million should be reached in 1985 and 1,000 million should be exceeded by the year 2000. The growth rate in broadcasting is also spectacular, the number of receivers throughout the world having tripled in the past ten years.

While 37 countries were represented by 350 exhibitors at Telecom 75, over 40 countries and some 500 exhibitors are expected for Telecom 79. The authorities of the city of Geneva, aware of the importance of Telecom 79, decided to establish a Telecom 79 'area' of some 70,000 square metres, including the Palais des Expositions, an all-purpose hall of 6,000 square metres and an adjacent open-air area of 10,000 square metres.

In such an enormous exhibition, where the equipment shown will represent a value which is hard to calculate but which will reach several hundred million dollars, there can be no doubt that, although all telecommunication sectors will be represented, special emphasis will be placed on communications between computers and on direct broadcasting by satellites.

For 1978, investments in telecommunications can be estimated at some £15,000 million; a figure eloquent of the important part played by telecommunications in the world economy. This aspect of the problem has not escaped the notice of financial circles, and some of the largest banks have reserved space at the exhibition.

Telecom 79 is not limited to the presentation of equipment. Four other events are directly associated with it. The 3rd World Telecommunication Forum 79 is being organised by the ITU in cooperation with over 45 scientific and engineering associations from all over the world. Part 1, entitled 'Telecommunication perspectives and economic implications' will be held from 19-21 September, and Part 2, the technical symposium, will take place from 23-26 September.

Also taking place during Telecom 79 are the 3rd International Festival of Telecommunication and Electronics Films (The Golden Antenna Award); the 3rd 'Youth in the Electronic Age' photography and drawing competition; and the 1st World Book Fair on Telecommunications and Electronics.

It should be stressed in conclusion that this world exhibition, arranged at the wish of the 154 member countries of the ITU, is a non-profitmaking operation managed by the union for the benefit of its member states. The budget of over £1½ million is entirely devoted to the efficient operation of the exhibition and, after its closure, to preparations for the next one. It is indeed significant that many heads of state have consented to join a Committee of Honour intended to enhance the moral authority of this event, which plays a considerable role in promoting the harmonious development of telecommunications and consequently, in the final count, social and economic development and the maintenance of world peace.

John Howkins, Editor, InterMedia

The management of the spectrum

Around evening on 14 April 1902 the wireless operator on a small ship the *California*, sailing in the north Atlantic, noticed a large iceberg in the shipping lane. He radioed a general warning to all ships in the vicinity.

His warnings were not much noticed. Several ships that were in reach of his signals had no radio. One very large liner, the *Titanic*, about 15 miles away, had a radio, but its operator was busy, and told the *California* to 'shut up'. The *California*'s operator had been on duty for 16 hours. He was very tired, and he soon went to bed.

Within a few hours, the *Titanic* hit the iceberg. It radioed for help. The ships that had no radio could not receive its cry. The crew of the *California* saw some flares, but did not bother to wake their wireless operator. Fortunately, the *Carpathia* did hear the *Titanic* SOS; but she was much further away, and did not arrive till daybreak, when the *Titanic* had disappeared.

The sinking of the *Titanic* and the loss of her 1,500 passengers and crew demonstrated both the benefits of radio communication and the problems of making the new device actually work. Today's ships have better equipment, but they still have problems.

The most advanced novelty is the maritime satellite system now being operated by Comsat General, Inc. Three satellites, launched in 1976, provide worldwide coverage. The terminals are expensive, however, and only a thousand have been installed.

Most ship-owners prefer to rely on their traditional HF radio links. The equipment is familiar and cheap. They are likely to switch to Marisat only if they are wealthy, or have a special need. A major US oil corporation, Phillips Petroleum, recently switched, with good results. It discovered that one of its survey ships, which was heading for Majunga in Madagascar, would be impounded on arrival because of an insurance claim against the company on another of its ships. The Phillips survey ship, like almost all ships, could communicate only in morse code. Phillips tried to make contact but bad weather made the signals indecipherable. Then the US Marisat satellite became operational, on much higher frequencies which were unaffected by bad weather. Phillips was able to tell its ship to change course for a safer harbour.

So a modern *Titanic* might be safer. But the multiplicity of radio signals can generate its own problems. Everyone who has tried to tune a radio to receive a broadcast signal, or tune one mobile radio to make contact with another knows about interference. It's always annoying. It can be worse.

In the UK and France it happened (by chance; astonishingly, no public authority checks these things) that the national electricity supply company (the Central Electricity Generating Board, and Electricité de France) were both transmitting voice and data signals on the same frequency and at the same place as some radio beacons that were supposed to guide pilots to certain airports. In both countries, pilots began to mistake the data signals for their radio beacons. Their radio compasses could not tell the difference between the two (identical) sources of radio signal. In France, the interference was almost certainly the major reason why two planes, in separate incidents, executed perfect landing patterns in the wrong place – near the power lines, and far from the airport. The planes crashed. The electricity companies have now changed their frequencies.

Sometimes the same kind of communication (content) can be achieved in completely different ways (form).

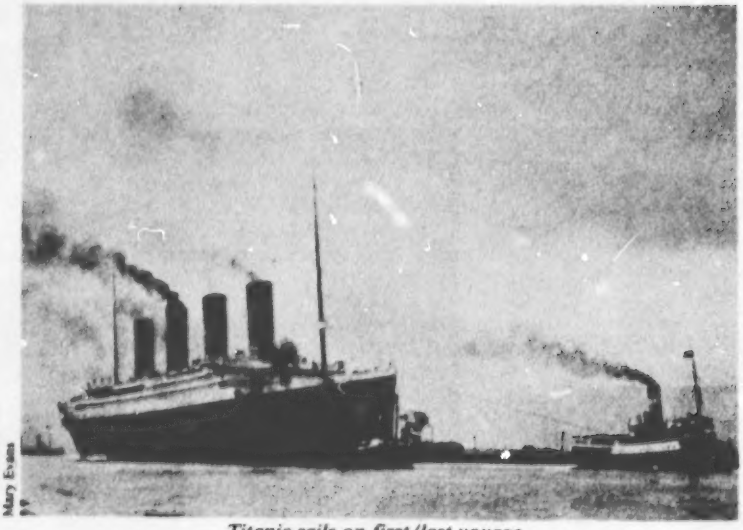
During a delicate stage of the Begin-Sadat talks, an aide of the US President flew into Cairo airport in the presidential jet, travelled swiftly to the terminal in a presidential car, and walked directly to a telephone to ring his associates in a local hotel. He had crossed the Atlantic in only a few hours and thought his journey was almost ended. He felt tired but, as he dialled, expected that this one call would complete his mission.

The hotel's telephone was engaged; then unobtainable. Regular travellers may recognise the situation. But presidential aides are not ordinary people. He returned to his plane and rapidly set up an international top-priority satellite link from Egypt to Washington, DC, and from Washington, DC, back to Egypt – but this time, to the hotel – making a round trip of about 50,000 miles. This time, the connection was made, and communication took place.

Even in the same place, on the same day, entirely different forms of radio communication can exist – different in their political, financial, social and legal implications – and be available to different people, for the same purpose or for different purposes.

A BASIC RESOURCE

The spectrum gains its importance as the basic resource of radio communication in a world which is increasingly dependent on radio communication. It may not, at first glance, appear much like a resource ('Sharing the Invisible Isn't Easy', title of article in *In Search*, Canada). But there is now substantial agreement, on both legal and technical grounds, that it serves humanity best to treat it as one. The idea became as near official as it can be when the International Telecommunication Union, the United Nations agency that regulates the spectrum, inserted into its convention at Malaga-Torremolinos in 1973 the phrase that 'radio frequencies and the geostationary satellite orbit are limited natural resources' (article 33).



Mary Evans

Titanic sails on first/last voyage

Certainly, the spectrum requires the care and attention of a limited, natural resource. The work is complicated by the spectrum's unusual characteristics. It cannot be exhausted (like fossil fuels) or temporarily or even permanently damaged (as the sea and the land). But it can be used or misused – used too much, when the result is interference, or used too little, and wasted. More than any other resource, perhaps, the spectrum requires careful management. It requires it on a global scale, yet to a fine degree. The mechanisms and the results of this management are often couched in engineering terms and calculations of esoteric meaning.

The management of the spectrum is the topic of the World Administrative Radio Conference (WARC) that will open in Geneva on 24 September. It will last ten weeks, ending either on Friday 30 November or on Saturday 1 December. The conference is organised by the International Telecommunication Union.

Why is the conference being held? It will be inordinately expensive, intractable and exhausting. The answer is that the ITU wishes to ensure that its regulations are in good shape for the next two decades, and beyond; and the grand conference is the union's time-honoured way of deciding such matters.

The ITU is unique amongst UN agencies in having no permanent legal title but only a convention, which must be continually renewed. It does not have a legal body. Other UN agencies, like the International Civil Aviation Organisation (ICAO), has a permanent legal structure, with committees that are capable of reviewing and changing the organisation's regulations. But the ITU's raison d'etre is technical, not juridical. It has to rely on ad hoc conferences of all its members to make changes. They are excessively cumbersome.

Since 1947 the ITU has held many WARCs, of varying kinds, to deal with specific aspects of the spectrum – particular services (eg, broadcasting, mobile radio) or bands of frequencies (eg, the HF band). This year's WARC (sometimes called a general WARC) is a much grander affair. Its brief is to deal with the whole structure, the framework of radio regulation.

The WARC is probably the most complicated and significant intergovernmental conference – and the one with the most ramifications – to be held for very many years. It has the authority and ambition to change the ways in which the world community regulates the spectrum. 'By regulating the use of the spectrum', Glen Robinson, chairman of the US delegation, told a group of congressmen, 'the conference can exert a powerful influence on the character of the flow of information both nationally and internationally'. It can achieve a most substantial re-distribution of that most basic wealth.

The last time the ITU held such a thorough investigation into the spectrum at a similar WARC was back in 1959. In those twenty years, the crux of telecommunications, the relationship of the user and the technical means, has changed enormously. The world map has changed. A large number of delegations at Geneva will be representing countries that did not exist in 1959. The internal dispositions of power within societies (whether consumerist or totalitarian) have greatly changed.

Telecommunications has altered even more substantially – both as cause and as effect. New technologies, undreamt-of in 1959, have become commonplace. In the 1950s the world telecommunications map showed heavy concentrations in a few northern industrialised countries. There was little international traffic. The means of communication were few; capacities were limited. Today, new technologies of transmission and switching have led to a plenitude of communication devices and means, and a quantum jump in capacity. Whole areas of social activity – government, industry, social services, transport, tourism, military matters, education, medicine, international relations, retailing – are dependent on mechanical and electronic communication devices.

The more industrialised a society, the more telecommunications capacity it possesses and the more it needs. The extent and complexity of a country's telecommunications system form a contemporary yardstick of its industrial competence. For many years, the popular indicators were steel-making and the number of miles

of railway line. Now, it is the communication of information.

The charts of national achievement make this very clear. In the world there are about 400 million telephones; but Central and Latin America, Africa and Asia combined can muster only 30 million. In other words, 29% of the world's population have 75% of the worlds' telephones. The growth of the telephone is only one example – but the most dramatic and simple – of telecommunications means. Each new unit added to a communications network, of any kind, makes each existing unit more valuable and more easily available for further and more diverse communication links.

The means for such expansion is the spectrum. Yet the spectrum is now allocated very unequally. As Ali Shummo, Minister of Information of the Sudan, said at a recent IIC meeting, 'you (the developed countries) have 90% of the spectrum and 10% of the population. We have 90% of the population and 10% of the spectrum'.

The explosion of telecommunications in the second half of the twentieth century may be compared to the transition that humans made thousands of years ago from hunting to agriculture, or, more recently, from an agricultural society to an industrial society. The transition of industrial societies, via the limbo of the 'post-industrial society', into fully-fledged information societies – as we witness now – makes telecommunications the hallmark and defining characteristic of our society. It is the measure of a society's wealth or poverty, and a major factor in a society's capacity for change.

A considerable amount of modern telecommunications research, development and marketing can be seen as an attempt to use the radio frequency spectrum more efficiently. Many of today's newer services require very large capacities (ie, colour television, high-speed data links). The higher the frequency, the greater the capacity to transmit information. Therefore, there is a constant push to exploit the higher frequencies. The regulation of this increasingly large and increasingly valuable spectrum (both achievements being the result of human ingenuity and management) necessitates innovation and regulation in the sphere of human organisation as profound as the innovations in the technical field. Unless the spectrum is managed and regulated, it can hardly be used at all.

The ITU and its members are continuously responding to an ever-changing set of imperatives. The spectrum itself provides constraints. Clearly, some services need the spectrum more than do some others. Mobile radio in cars, planes and ships, depends absolutely on its technical ability to send and receive over-the-air. It depends upon spectrum for its existence. Other forms, including some broadcasting and fixed services, can use wires and cables. Therefore, it is argued (by China, Switzerland and others), when the spectrum is crowded, the services that can use wires and cables should do so, and vacate the crowded airspace, wherever possible. But the politics and moral equity of allocation is not far behind. Who should judge the possibilities? Should sanctions be applied?

The problem of sharing the range of frequencies usable at any given moment between users as varied as ambulances, ships, citizens' band operators and broadcasting stations, in over a hundred and fifty countries, is thus a major issue of international politics and governance.

The job of the WARC, and of each delegate at the WARC, is to ensure the coherence and sanity of this telecommunication regulation for the next few decades. As the IIC said in its WARC Briefing Paper: 'By the end of the century – this prediction may be made with confidence – no aspect of human society will fail to bear the imprint of the decisions made at the WARC of 1979.'

How can this goal of coherence and security be won? First, national positions at the WARC should be based on a complete professional grasp of the technical issues. Questions about channel spacing, propagation, etc., should not be confused, or their solution delayed, by unpreparedness at the technical level (except where technical knowledge is itself unsure or where it depends, like troposcatter, upon practical trial). This technical data and discussion should inform the entire delegation, not only its engineering and technical staff. A general familiarity and expertise in technical matters should indeed pervade the entire conference.

Second, each delegation should have an equally intelligent grasp of the concomitant social, cultural, economic and legal factors. As Jean Voge, Ingenieur General des Telecommunications, PTT, France, said at the IIC's 1977 Annual Conference in Washington, DC, in September 1977, 'the events and issues of the 1979 WARC will be very different from those that faced the preceding conferences in 1947 and 1959. Then, it was posible to satisfy almost all needs, all demands, for spectrum use by a detailed procedure of coordination, regulation and planning that was based essentially, if not solely, on technical criteria. Today, that kind of exclusively technical thinking is no longer possible. Economic, social and political factors must be considered alongside the technical when fixing priorities. And we must not forget the subtle principle of equity, between countries, both developed and developing; between services; between users; and ultimately between individuals.'

National positions should reflect this approach: they should be multi-sectoral, multi-disciplinary, open. National telecommunications policies should be related to other national policies – on transport, for example, and on education and regional development. They should take account of international and regional contexts. Engineers and others have long collaborated: in Asia, the governments of Malaysia, Brunei and Singapore regularly coordinate frequency assignment; the 86 non-aligned countries have been very active in holding joint meetings; the USA and USSR have met several times as part of their preparations for WARC; and the European Broadcasting Union, and other regional broadcasting associations, have long acted in unison.

But this collaboration between engineers, on technical matters, is an isolated phenomenon. Other groups in society have not joined in.

In Europe, where the European Commission is masterminding the continent's greatest peace-time shift in political and economic power (symbolised by this summer's first-ever direct elections to a European parliament), the matter of the spectrum is seen as peripheral. The commission gives to telecommunication policy not one thousandth of the attention it gives to economic policy. And most of the proposals of the nine member governments do not refer to the European Communities' vast ambitions.

Third, the preparation of a national policy for the 1979 WARC (indeed, of all communications policy) should be a public matter, publicly discussed. It is proper that spectrum regulation at the national level is the business of government. It is equally proper that government should encourage public debate. The argument that spectrum policies are too technical is spurious. Monetary matters are equally 'technical', and often esoteric, but few people doubt the public's right to involve itself in discussions on, say, interest rates or to claim the necessary information to do so.

But very few governments have encouraged the public to participate in the national preparations. The work of the various US agencies is an honourable exception. The meetings of the State Department's Advisory Committee, and of other organisations, were

open to the public, and the documentation was plentiful.

Most governments, whether liberal or conformist, plural or totalitarian, regard the spectrum as their own business. Sometimes they are challenged. In the UK, the Home Office was strongly challenged over its proposals for the land mobile radio service. In 1975 it commissioned an official, John Warden, to examine the mobile service and suggest means of making it more efficient. Mr Warden was discouraging. He said that there was little need for more frequencies, and that any congestion that did occur could be minimised by better trained operators and by lowered standards.

The manufacturers and users were very annoyed. One of the virtues of mobile radio is that anybody can quickly learn to use it; furthermore, they said, the technical quality needs improving, not a further worsening. They proposed more frequencies in the short term and, eventually, a switch to single sideband

As a riposte to the Warden Report (which was never officially published), Pye Telecommunications did a study of mobile radio which contradicted Warden's analysis and put forward a much more positive view. Its chief author was W.M. Pannell. He described the 'undeniable social benefits of mobile radio' and said that 'the increased use of mobile radio could play a major role in improving the nation's business efficiency and international competitiveness, and have a worthwhile effect on energy conservation.' It asked for a substantial increase in spectrum space (including the allocation of TV bands I and III, 41-68 MHz and 174-216 MHz, which have been used for 405 television).

The Pannell report is a rarity – a spontaneous, private, contribution to a government's WARC deliberations. It is very likely that it had some effect.

The real cause of the dispute (and the reason why it was so acrimonious) was the assumption by the UK Home Office that it could prepare for the WARC in virtual isolation, even secrecy, from the various streams of expertise and knowledge that existed in Britain, then and now. Its proposals have been published, but publication hardly helps: the documents do not begin to deal with policy, or with the reasoning of policy; they give only the results.

The UK Home Office is no different from the vast majority of other national telecommunication authorities. Actually it is rather better. It did consult with a few people, and it has published its proposals. In the USA, the conflicting claims of the mobile radio lobby and the broadcasters for several bands between 470 MHz and 890 MHz led to a row that was almost as bitter as the UK's. But the open and participatory nature of the FCC's and NTIA's preparations – the continuous publication of ideas for public comment, the open meetings – meant that the conflict was resolved by both sides having a fair opportunity to reason their case in public.

PREPARATIONS

For this year's WARC, the ITU has held several preparatory meetings, including regional seminars in Nairobi, Panama and Sydney. Most industrial countries used these regional seminars as a useful opportunity to meet engineers and policy-makers from the developing countries. Also, the ITU's CCIR convened a Special Preparatory Meeting in Geneva at which ITU and national engineers reviewed the technical aspects of spectrum management. More than 750 engineers, from 87 countries, discussed over 400 papers. Their report totalled 600 pages.

This month, at the WARC itself, the ITU expects at least 1,500 delegates from about 140 governments. The Secretary General, M. Mili, said in June that he had so far 'received proposals totalling 4,000 pages, which is over twice as many as we expected.' The union has ordered 96 tons of paper to meet an unexpected demand for 27 million pages of documentation. The discussions in the WARC will be complemented by Telecom 79, probably the world's largest telecommunications exhibition, a technical symposium and various other exhibitions.

THE AGENDA

The curriculum is daunting. The agenda ranges from general principles of administration to detailed allocations of individual frequencies.

The eleven items can be simplified into three main sets of issues. The first is the allocation of frequency bands, which relates directly to the Radio Regulations, and is the business of every administrative conference. The conference will do most of this work under item 1. The question of definitions, which also appears in item 1, is not expected to raise any problems; most delegations have said they are happy with existing ones.

The exception, however, is drastic. The very definition of radio might be changed. The CCIR Plenary Assembly has already suggested that the definition of the radio frquency spectrum is too restrictive because it covers only waves with frequencies lower than 3,000 GHz. (The Table of Allocations allocates frequencies from 10 kHz to 275 GHz). The development of optic fibres and lasers which operate at much higher frequencies clearly makes nonsense of the restriction. The remedy, however, might be to remove any upper limit; in that case, the ITU would be responsible for X-rays, gamma rays, etc. It is obviously a fundamental issue, with many implications. The USA want nothing of it; the UK wants to put off any discussion to the 1982 Plenipotentiary. The conference will probably follow the UK line.

In general, however, the thrust of this set of issues is the need for new frequency allocations to meet changing technical, social and economic circumstances. The bulk of the work is tedious – the allocation of particular frequencies to particular services in particular regions – but important.

The technical standards governing allocations will also be discussed. Should a band of frequencies be allocated to one service or to many services? Sometimes, technical constraints means that a single frequency cannot be shared. But the industrial countries are continually developing techniques that make sharing more possible. Trouble is, the techniques are usually complicated and expensive. The USA insists spectrum sharing is the only way to accommodate all proposals. The developing countries say they can't afford it.

The second set of issues centre not so much on the allocation of bands of frequencies to services, but on the allottment of individual frequencies to countries. The conference will probably use items 2 and 5 to discuss the way in which the ITU operates as a mechanism for regulating the spectrum. Very briefly, the alternatives are to allot frequencies on a first-come, first served basis; or to plan ahead, and to allot them on estimates of likely need. The agenda says the conference can look at these procedures and 'review and, where necessary, revise'. Most countries want to revise.

The third group of issues is the union's programme of activities over the next few years – and beyond. Item 10 asks for guidelines for future administrative conferences. Item 11 is a catch-all: it asks for 'guidelines for the optimum use of the frequency spectrum'. It may simply be taken with item 10, but it might provoke an intensive investigation of the ITU's entire means of operation.

THE PROBLEMS OF ALLOCATION

The main management problem now facing the ITU, and the conflict that is likely to dominate the WARC, is the allocation of frequencies. The ITU finds it difficult to do some parts of this job as well as some members would wish mainly because it was set up, over 110 years ago, to do something completely different. The original convention dealt only with telegraphy. It was signed in 1865, some thirty years before radio, and frequencies, were discovered. It was signed by a mere 20 countries – and the common cultures of those countries, and their common trading ambitions, largely explains the success of this first-ever international agency. It needed only common sense to agree on such straightforward matters as morse code and the reply-paid telegram.

The union began to deal with telephony in the late 1890s, and with radio in the first years of the new century.

A series of conferences were held before and after the second world war, culminating in the International Radiotelegraph Conference of 1927 which was held in Washington (the first union conference to be held outside Europe). The main achievement of the Washington Conference was to set up a Table of Frequency Allocations. The procedure was simple. Users notified the union about the frequencies which they were already using or wished to use and the union registered these in its master list. Neither the union nor the user owned the frequency. What happened was that, through the union's processes of registration, the user had a squatter's right to a specific frequency. Furthermore, the union's recognition of a particular usage gave the user some protection in international law. This principle still dominates ITU thinking, but it has been modified substantially.

It has long been recognised that the spectrum was a limited resource, in spite of the energetic and successful searches for new bands in the higher frequencies. The success in finding them was unexpected. Their names suggest how, each time, the newly-discovered band was felt to be the last; high, very high, ultra high, super high and extra high.

In the thirties, the conviction grew that the ITU should take a more active and positive role in managing the spectrum. The change came at the union's Atlantic City conference in 1947, when it agreed to adopt a series of plans for each service and each region. Over the next few years a complex hierarchy of organisations and procedures evolved, at varying speeds and varying degrees of interaction.

New principles, new formats, were badly needed. Indeed, the ITU now faces an immense task of management, of itself and the spectrum alike. And it undertakes this job in the knowledge that its remit is no longer a matter of the technical adjustment of a relatively minor subject but a matter of intense social significance, with global connotations, and requiring fine considerations of equity.

How does one judge between demands from different users? The HF bands are wanted by industrial and other countries to broadcast short-wave international services (eg, the BBC's External Services, Voice of America) and by non-industrial countries to provide long-distance telephone links. The UHF bands are wanted both by the users of mobile radio (a major growth area) and the owners of portable TV sets (similarly expansionist).

Another band is claimed both by NASA and the United States Air Force. The USAF wants to use the band to operate a satellite system for worldwide navigation. NASA wants to use it to contact extra-terrestrial intelligent beings. It says that if it doesn't get this particular band it will have to set up transmitters on the far side of the moon (everywhere else, interference would be too great). How can one judge between such demands?

The preparation for this autumn's conference have shown the existence of two separate ideologies. The older countries, which enjoy squatter's rights to huge chunks of the spectrum, wish to maintain the orthodox approach. They are in the grand tradition of the ITU. The first country to use a frequency, or notify the IFRB of its intention to use it, has significant, permanent advantages. At least, in the terrestrial bands; the ITU has recently become a little less generous with the satellite services. But the benefits to the first arrival are very great. The ITU does not have any power to adjudicate between a squatter and a new claimant.

The older countries therefore talk a lot about more efficient (which generally means more expensive) uses of the spectrum. They resist alterations to existing allocations and prefer to search for even higher frequencies for the new services. The US State Department spoke for the industrial countries when it said that 'Frequency assignments should be based on demonstrated need and the ability to utilise them. The concern is that fixed allotment plans which distribute frequencies and orbital space to countries or areas independently of such need or the ability to utilise may not allow the optimal utilisation of the spectrum, or provide adequate incentives for the adoption of technologies and patterns of use that conserve the spectrum.' The USSR takes roughly the same position. It is somewhat opposed to the grand conference and prefers to formulate policy on 'the basis of the results which are obtained by the CCIR in the course of its routine activities.'

The blatant bias of the conventional 'first come, first served' approach is partially compensated by its flexibility and efficiency. It does encourage the development of new technology. And the technology of radio is changing extremely fast. Single sideband (SSB) transmission, spread spectrum technology, digital operation, the new technologies that allow closer channel spacing, the new satellite technology that allows more precise beams, etc, will have a great influence on the use of the spectrum. But, for all its virtues, the conventional approach has too many weaknesses to survive the WARC without being modified.

An alternative ideology is favoured by the newer, younger countries who do not have much spectrum space, who do not have satisfactory telecommunication networks and who cannot afford massive development plans. They want more forward planning, possibly with a system of 'a priori' reservation. They wish the spectrum to be allocated before the telecommunication empires of the industrial countries gain even more squatter's rights; and they want it allocated fairly.

Their first success within the ITU came in 1974 when the union's Maritime Conference allocated frequencies between 4,000-23,000 KHz for the use of coast radio-telephone stations. The conference agreed to a fully-fledged plan that allotted channels according to a mathematical notion of fairness. Some very small countries (including some islands) got nothing. In contrast, and to the indignation of the USA and others of the 'old guard', certain land-locked countries (eg, Bolivia, Hungary) were assigned frequencies. The USA joined Canada in telling the ITU that it would not be bound by the conference's decision (a rare but not unique act).

A similar kind of plan was adopted at the Broadcasting Satellite Conference of 1977. Most countries were allotted 2, 3, 4 or 5 channels (with larger countries getting many more) regardless of their expressed need for satellite channels or their ability to use them. For instance, the Republic of Cape Verde was allotted the same number (five) as the United Kingdom. Mali got

twice as many (ten) as both of them. The USA was greatly dissatisfied by the allotments (the delegation described them as 'unworkable' and 'highly arbitrary'). This time the USA and the other countries in Region II decided to hold a separate regional satellite conference after the technology had settled down, and after the general WARC. The conference is scheduled for 1983.

The plans are crude, and the flaws are obvious. But the move towards greater management and planning, towards intervention, is likely to be irresistible and for good reason.

It must be said that the industrial countries, who have massive resources and great skill in these matters, have not really exercised either in the search for better planning. They are finding it very difficult to adjust to the new situation (a failure that is evident in most international arenas, whether the subject is raw commodities or technology). They prefer to continue, as long as possible, with their traditional methods, rather than work towards the success of the new ones.

One exception is a scheme proposed by the Brookings Institution, Washington, DC, as part of their analysis of possible market-place 'regimes' for the sea, for space and for meteorology. They proposed that ownership of the spectrum and geosynchronous orbit be vested in the members of the ITU and that some part of the ITU (possibly the IFRB) be set up to manage it on a commercial basis. Users would be charged fees for frequencies and orbital positions. The fees would be distributed to all ITU members. Countries that didn't use much spectrum would have some income, while those that did would have a far wider range from which to choose. One drawback to the change of direction – in the short run, at least – is that it requires more from the ITU than the union may be able to supply.

The union's constitution means that every plan, each allocation, has to be added to the existing Radio Regulations. As a result the Regulations have begun to lose coherence and consistency. No one would disagree that they are fearsomely complicated. Both critics and friends of the ITU assert that some articles are so abstruse that they are meaningless (there is a story that one man did understand them, once, but he cannot now be found). Abderrazak Berrada, Vice-Chairman of the IFRB, wrote in *Frequencies for Satellite Broadcasting* (IIC) about the obscure nature of articles 9 and 9A: 'Though the provisions of these articles are of fundamental importance, they are rarely referred to; perhaps because of their complexity which is such that only a small band of initiatives can find their way through the maze of clauses.'

There is a strong feeling that the Radio Regulations should be revised. They are difficult to understand, awkward to change. Many ITU conferences have passed motions on these lines. The 1974 Maritime Conference transferred some regulations from the general package to the CCITT's own, and asked for a general revision of the Radio Regulations 'as a matter of urgency'.

The WARC can deal with these questions. Its agenda allows it, in item 4, to make the necessary 'editorial amendments' to most of the Radio Regulations. Item 7 talks bluntly of 'harmonising' the regulations and deleting 'superfluous or redundant provisions'.

But substantial change is unlikely. The Radio Regulations will probably be changed the minimum necessary to incorporate the WARC's other decisions. The real changes will not come until the next Plenipotentiary Conference, which is scheduled for late 1982.

There is no doubt, however, that the ITU's way of managing the spectrum will dominate the WARC. Some industrial countries, long used to squatter's rights, regard the ITU's new thrust as rather a nuisance. Some developing countries regard the ITU as the only platform where the majority can work to correct the mistakes of the past seventy years. They know that ITU business (in conferences, seminars, study groups, etc), and telecommunication manufacturing, has always been the preserve of the industrial countries. They reckon it's time for a change.

Most countries also realise the ITU has a long tradition of technical expertise (most notably, on standards) and will not jeopardise it. Part of the interest of the ten-week WARC will be to see what kind of ITU emerges at the end of it.

THE HF BANDS

The work at Geneva will be an exhausting combination of details and principles, of engineering practicality and political ambition. To balance these pressures would be a considerable achievement in any circumstances. At Geneva, delegates will be uncomfortably aware that the ITU may be expert in technical matters but that it is inexperienced in political and social debate. In addition, the 150-odd delegations will arrive at Geneva with vastly different resources. They will be of all shapes and sizes. The USA is expected to have the largest delegation; its preparations have been energetic and outspoken. Many smaller countries may have only one or two people, and their perceptions and worries will be very different.

A major conflict, at all levels, is expected over the high frequency bands (3 MHz – 30 MHz). These bands have always been popular, in all countries, and for many different purposes. They exemplify the problem of the entire WARC.

At present the high frequencies are not planned. Users simply notify the IFRB that they wish to use such-and-such a frequency (the exceptions are the maritime and aeronautical mobile service). The band's popularity, and the absence of planning, has resulted in confusion and overcrowding.

The behaviour of an HF signal does not encourage easy regulation. In daytime the 'ground' signals travel about 50 miles and the 'sky' signals are absorbed by the ionosphere; so the 50 miles of a groundwave may be the maximum range. But at night, the ionosphere changes, and reflects the skywave signals back to Earth which reflects them back to the ionosphere, and so on (the ionosphere character was discovered in 1902 by Richard Heaviside, who gave his name to its heaviside layer). The HF signals thus reach thousands of miles.

This varying and uncontrollable propagation led the ITU, in its very early days, to allocate most HF bands on an exclusive, worldwide basis; that is, they are allocated to one service, not shared, and the allocations are the same in all three ITU regions. (The ITU classes countries into three regions: Region I covers Europe, USSR and Africa; Region II covers the Americas; and Region III covers Asia and Australasia.)

The HF bands, like most others, are allocated to a very large number of services – among them, the broadcasting and fixed services, the maritime, aeronautical and land mobile services, the amateur service and the amateur satellite service (seven launched so far), radio astronomy and some space research and satellite identification services. About half the bands are allocated to the fixed services; about 35% to the mobile services; and about 10% to broadcasting.

The multiplicity of services is typical of almost every part of the spectrum. The Table of Allocations is resplendent in detail; the exceptions outnumber the rules. In the HF bands, for instance, 41-44 MHz is allocated in 'Rhodesia and Nyasaland' (now Zimbabwe and Malawi) to a whole range of special services. The reasons are clearly closer to past political necessity than today's realities; closer to imperial privilege than independent competition.

The bands are best known for their broadcasting

services. The BBC's External Services, Radio Moscow, Deutsche Welle, Radio Peking, Voice of America, Voice of the Arabs, etc, rely on these exclusive, world-wide allocations of frequency to transmit, often at very high power, their various programmes of propaganda and information. The station's transmissions are often technically aggressive. They interfere with each other within the allocated bands, and they sometimes use bands that have not been allocated – known as an 'out-of-band' use – which the ITU allows so long as the out-of-band signal does not interfere with other, more legitimate signals.

In 1976, the BBC and Deutsche Welle stated that 14% of HF stations were operating out-of-band. They calculated that the international bands were over-used by a factor of 3 to 4. The traditional operators are increasingly being joined by other, newer, stations. In Africa, the interference is sometimes very great indeed, with stations jostling for space (Egypt ranks fourth amongst HF broadcasters). It reckoned that only one-quarter of the signals are properly received by their intended audience.

The major use of the HF bands is not for broadcasting but for the fixed services, which encompass any radio communication between two or more fixed points. The HF fixed services are the traditional work-horses of a domestic telecommunication network (telephones, etc).

The developed countries, naturally, were the first to use them. The equipment was cheap and easy to maintain, but it was unreliable, and did not have much capacity. Gradually, these countries moved their fixed services to the higher microwave frequencies (either on terrestrial networks or by satellite). The USA now uses HF only for military communications, where they have special advantages.

The virtues of HF have long appealed to developing countries, and they now rely upon HF to an even greater extent than did the now-developed countries. They provide the only economical – and sometimes the only possible – means of interconnecting their dispersed populations. They connect remote areas to the main national networks (for commerce, social services, education, public administration, and much else). At their meeting at Yaounde in May the non-aligned countries resolved that the 'utilisation of HF bands for Fixed and Mobile services was considered extremely important for developing countries because of the possibilities they will always offer to serve very large areas at lower cost. Developed countries possess more viable and more extensive means to satisfy their needs and could consequently give up the use of HF bands in favour of developing countries.'

Is it predictable that the developed countries should begrudge the developing countries' use of frequencies which they themselves once used so heavily and have now discarded? At WARC both the developed and the developing countries will propose more HF frequencies should be allocated to broadcasting. The USA and many developing countries would switch frequencies from other services to increase the broadcasting allocation. But which existing service should suffer? The USA would take frequencies from the fixed services; so would most industrial countries. Most developing countries, however, would take them from the amateur service and the mobile services. At the African WARC seminar organised by the IIC and others in Nairobi last year, the delegates said firmly that 'pressures to restrict the fixed service, particularly for the sake of international broadcasting, were not in the interests of African States.' But it's a real dilemma. Many developing states, in Africa and elsewhere, are eager to start their own international broadcasting service. In the Asia-Pacific Broadcasting Union a majority of members actually wanted to switch some fixed allocations to broadcasting.

One drastic solution to HF overcrowding, already tentatively raised within ITU circles, is to move from double sideband transmission to single sideband. The effect would be virtually to halve the bandwidth needed by each transmission. The USA has therefore proposed that double sideband 'shall be discontinued no later than 1 January 1995'. Trouble is, every transmitter would have to be modified and every receiver replaced. The non-aligned countries urge 'the longest transitional period possible'.

A less contentious proposal, backed to varying degrees by most of the non-aligned countries, is to keep the frequencies below, say, 10 MHz for the fixed services and to increase the allocations above 10 MHz for broadcasting. The frequencies below 10 MHz, anyway, are best for the fixed services. If this proposal is accepted at Geneva, much of the expected conflict could disappear.

The fate of the HF bands is intertwined with the fate of the 'tropical bands'. These five bands range from 2,300 kHz to 5,000 kHz; where the frequencies change from being called 'medium' to be 'high'. In the tropics (roughly, between the tropics of Cancer and Capricorn) the bands have always been allocated to broadcasting, regardless of the allocations made elsewhere, and the broadcasting service has always had priority. The reason for this special treatment was that the tropical countries' rainfall and humidity meant that the low and medium frequencies were virtually unusable. They were therefore given an extra package of the frequencies they were able to use.

Advances in technology, however, have enabled broadcasters in tropical countries to transmit successfully on some of the frequencies that earlier were unusable. The non-tropical countries have therefore said that the tropical countries should no longer merit special treatment; the bands should be allocated fairly and equally to all.

Not so, say the tropical countries – at least, the majority of them. They want to keep the tropical bands as a special allocation. They say they cannot afford the sophisticated technological advances that would allow them to exploit other bands and, furthermore, that their societies' multiplying needs would more than fill any increased capacity. They say that all developing countries have long been deprived of spectrum space. They should now have more, not fewer, frequencies.

MOBILE RADIO

One of the most obviously expansionist sectors of modern communication is mobile radio, especially the land mobile service (the other mobile services are the aeronautical and the maritime). Mobile radio epitomises the widespread desire for a communication service that is two-way, personal and flexible, and usually cheap and lightweight. The range of services is very wide – Citizen's Band, bleepers for businessmen, doctors, etc; two-way radios for taxis, delivery vehicles, the police, service engineers, etc; temporary radio networks in disasters; car telephones; and much else. The nature of the service means that the manufacturers, retailers and users tend to be individualistic and enterprising, even aggressive in their development plans and marketing. They desire the least amount of central government regulation, and the maximum freedom to exploit their own devices.

The variety of land mobile radio services was vividly presented to the ITU and WARC experts at the IFRB preparatory seminar last October, by Kiyoshi Oida, of Japan. He described a wealth of new services. He said that 'the ultimate aim of public communication is to enable the exchange of information at any time and at any place under any circumstances (for example, while in a vehicle or walking).'

He talked of the possibility, within two decades (ie, within the time-span of the WARC) of a fully automatic, portable telephone, with subscriber dialling, that could be easily operated while walking. This top-of-the-range device would be supported by a very wide range of mobile radios, of all kinds and capacities.

Growth is rapid. Japan now has 700,000 subscribers to radio paging systems. The ministry forecasts over three million will be subscribing within ten to fifteen years. Throughout the OECD countries the average growth rate is 10% or more.

Some governments distrust mobile radios, as they distrust Citizen's Band and amateur radio. They fear all communication devices that they cannot control or monitor. Afghanistan, Turkey and Uganda are just three governments that are violently hostile to the private use of mobile radio; many African countries share their suspicions. Indeed, many European governments have discouraged Citizen's Band.

But the demand for mobile radio in the industrial countries is ever increasing. In Europe, North America and Japan, the general policy at WARC is that more of the UHF band should be allocated to the mobile services; some exclusively, some shared with other services.

The UHF bands are primarily a national, not an international problem. Whereas HF signals can travel thousands of miles, UHF signals are constrained to a line-of-sight distance. Thus a country has to reach agreement with only its neighbours, not the whole world. The USA has to agree with Canada and Mexico; the Portuguese with Spain; Nigeria with Benin, Niger, Chad and Cameroon.

In North America, the service most likely to lose frequencies is television broadcasting. The complexity of the problem, however, can be gauged from the fact that in one small band, 470-890 MHz, Citizen's Band, the aeronautical and land mobile services, broadcast satellites, radio astronomy and FM radio are also users, or would-be users.

The broadcasters say that the demand for UHF television is expanding just as fast as that for mobile radio. The conflict has been resolved, but only in a temporary fashion. The US Federal Communications Commission has already taken some UHF frequencies away from broadcasting and assigned them to mobile radio. The Canadian regulatory authority has done something close to the opposite. It has set up more TV stations to broadcast cultural and educational programmes.

The UHF signals may not travel far but, like all radiowaves, they travel indiscriminately. America's mobile radio can interfere with Canadian TV, while Canada's TV signals can interfere with America's mobile radio. It is a perfect example, in spectrum terms, of the vast dilemma of nationality that haunts the two neighbours.

The UK faces a similar controversy. The broadcasting lobby is well-established and well-organised, compared to the manufacturers and users of mobile radio who, as everywhere, are pluralist, disorganised and unaccustomed to this peculiar mix of politics and engineering. But although the broadcasters lobbied hard, the mobile radio people lobbied harder.

The broadcasters have not entirely lost. They have got an important new allocation at the top of the existing VHF FM band. The existing allocation gives the 87.5 – 100 MHz band to broadcasting (now used by BBC and IBA radio), and 100 – 108 MHz to the mobile services. The Home Office is proposing both bands be altered. A new band, 88 – 104 MHz, should be given to the broadcasters, and the rest, 104 – 108 MHz, shared between broadcasters and mobile radio.

But elsewhere the Home Office is proposing to cancel the allocations to broadcasting at the top of the 790 – 890 MHz band and create a new band, 854 – 890 MHz, which would be allocated to the mobile services and the fixed services. The 890 – 960 MHz band would also be switched from broadcasting to mobile radio (the broadcasters somewhat jeopardised their case by the fact that they weren't using their existing allocation). These allocations are in Region I (which the UK shares with the rest of Europe, the USSR and Africa). The Home Office is also proposing that the 890 – 960 MHz band in Region III (Asia and Australasia) should lose its broadcasting allocation. The result would give worldwide support to the expansion of mobile radio.

The re-allocation of spectrum from the massive, monolithic broadcasting institutions to more pluralist, personal and two-way systems of communications marks a series of shifts of power and influence in each society. It is not possible to make such re-allocations of the most basic means of communication without provoking adjustments in the flow of communications. These re-allocations of spectrum are re-orderings of sender and receiver.

SATELLITES

Another key issue at the WARC will be the communication satellite. The advantages of satellites over terrestrial transmission are technical and ecnomic. Satellites are already a cheap medium for high-speed, digital, reliable communications. But the various technologies of launching, power supply, telemetry and transmission are moving ahead more rapidly, and in more diverse directions, than in most other areas. It is this speed of technological change that led the USA to disengage itself from the ITU's recent conference on broadcasting satellites. Indeed, the management of the spectrum for today's high-powered varieties of geostationary satellites tests the ITU's abilities to the utmost.

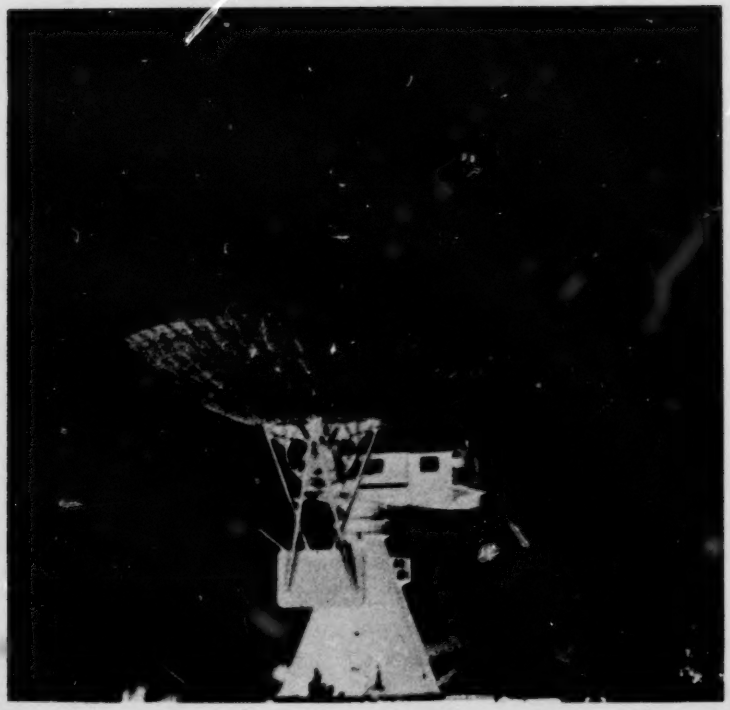
A geostationary satellite, orbiting 22,300 miles above the equator, needs both a frequency (actually, two frequencies, one for the up-link and one for the down-link) and a slot on the geostationary orbit. These factors are common to both the fixed service satellite (like the Intelsat series, Intersputnik, the US domestic satellites, Telesat's Anik, and all other current communication satellites) and the much more powerful broadcast satellite which will transmit its signals directly to domestic and community antenna. The only exception is Russia's domestic satellites, which do not use a geostationary orbit.

The ITU has not been idle in planning for both types. A 1971 WARC allocated frequencies around 12 GHz to both the fixed satellite service (FSS) and broadcast satellite service (BSS). In Regions I and III the BSS was given exclusive rights to a lower band (11·7 – 12.5 GHz in Region I and 11.7 – 12.2 GHz in Region III) and the FSS was given similar rights in the next higher band (12.5 – 12.75 in both regions). In Region II (the Americas) the BSS and FSS were to share, on an equal basis, the 11.7 – 12.2 GHz band.

Six years later, a special WARC on the broadcast satellite service proposed a detailed plan to allot BSS frequencies. Region I and III took the plan, but USA and Canada withdrew, saying that technological change and the 1979 general WARC would make it more sensible to wait a few years. The Region III conference is now scheduled for 1983.

Most of the countries in Region I and III, if not all, are generally content with the 1977 WARC's final plan. The European Broadcasting Union is probably speaking for both broadcasters and telecommunication authorities when it says that the 1977 plan has 'adequately regulated' the 12 GHz band. The UK and a few other governments would like to see a small extension of the allocations of the FSS; that is all.

Across the Atlantic, the USA and Canada are not so



ITU

A satellite ground station in the Yemen. The long exposure has caught the movement of both the Earth and the stars.

happy. The main contention is that the FSS and the BSS should not share the same frequency band (currently, 11.7 – 12.2 GHz). The experience of American aerospace manufacturers and space users suggests that frequency sharing (and the sharing of the geostationary orbital arc, as proposed in 1977) could be improved.

The idea of re-allocating the band so that the FSS and BSS had separate frequencies has been vigorously promoted by Satellite Business Systems, the consortium of IBM, Comsat General and Aetna Life Insurance. SBS plans to launch a series of high-powered, high-speed communication satellites to transmit data from and to American offices; the first is scheduled for late next year. The consortium claimed that frequency separation (say, 500 MHz each) would triple the number of orbital positions for both FSS and BSS. There are, SBS claims, beneficial side-effects. Allocating different frequencies would diminish the chances of interference between broadcast satellites in different ITU regions. It would also permit the large space platforms (the next technological step) to carry both broadcast and fixed service systems. The US State Department has therefore proposed that the fixed service, with several satellites in operation, should stay in the 11.7 – 12.2 GHz band and that the broadcast service should move to the 12.2 – 12.7 GHz band. The broadcast services would share its new band with the terrestrial fixed service, but that kind of sharing is not expected to be a problem.

Many other satellite services are dealt with in the US proposals. The State Department is asking for an allocation at 10.6 – 10.7 GHz for an operational system of 'passive sensing' or 'remote sensing'. These powerful satellites take images of the Earth and its resources which can be processed to produce valuable information. The images can map the location of mineral deposits, show the types of trees in a forest, indicate the health of crops, and a great deal else. America's NASA has already launched three Landsat satellites (the first in 1972) but the satellites are classed as 'experimental'. The USA now wants a permanent, operational system; and for that it needs a frequency. It has suggested 10.6 – 10.7 GHz.

The USA is also asking for a frequency for an entirely new service – the transmission of power from a satellite to the Earth. The scheme is for solar cells on a vast platform (around 20 square miles) to convert sunlight to electricity which would be beamed as a microwave to Earth and then fed into the national grid. The USA, acting on advice from the International Microwave Power Institute, has asked for allocations at 61.25, 120 and 248 GHz.

POLITICS OF COMMUNICATION

As telecommunications becomes more explicitly an integral component of national development, its political connotations become clearer and more powerful. It is not possible to say that communcations is central to social organisation, whether of a city or a continent, and then to expect politicians to leave future developments to the engineers. Entire volleys of experts – economists, planners, educationalists, researchers and others – will become involved. This month's WARC gains much of its potential for achievement – and for controversy – from this political awareness.

The industrial countries have been rather confused as to their best strategy in this situation. Harrison Schmidt, the former Apollo 17 astronaut who is now a US senator, sums the dilemma when he attacks the developing countries for asserting political issues at ITU meetings, and then attacks his own country's authorities for being too exclusively technical.

The ITU is experiencing the general trend towards a greater political awareness at a very high level of global interdependence. Most international organisations are becoming expressly more political. The United Nations and its family of agencies, which stress the community of all nations, and support that claim with action, voted on the basis of one member, one vote, are the most sensitive to the sea-change in international consciousness. In some organisations the effects are minimal – the various world meteorological organisations are excellent testimony to the success of technical collaboration taking precedence over political difficulties. But others can change greatly. The USA has resigned altogether from the UN International Labour Organisation. And the 'Helms' amendment prevented the State Department from paying its dues to the ITU this year – a failure which Glen Robinson, head of the US delegation, regards with some embarrassment.

In the ITU the developing countries, often organised within the Non-Aligned Group (originally 77, now nearly 90 countries) are taking a more political and more vocal role. The pivot on which they lever their influence is the democratic principle of one member, one vote. The main target for their ambitions is the ITU's general management of the spectrum – the ITU conferences as arena, the ITU organisation as referee.

The ITU, and especially the WARC, are located in a matrix of global issues and pressures (and their organisations). These issues will tinge WARC, and may substantially affect its work.

The overall context is the North-South dialogue. Or, rather the North-South and South-North and South-South streams of conversation, statement, monologue and gossip that, in public, gets called a dialogue. It involves discussion over a multitude of separate topics – from copyright to commodity prices. It concerns the transfer of technology. It also concerns the management of the spectrum, and the technology that is needed to use the spectrum. The ITU is responsive to these pressures partly through the monies given to it by the UNDP for technical assistance in developing countries.

The discussions in UNESCO are closely linked. UNESCO's main concerns are the New International Information Order, which encompasses a complete re-arrangement of information power, the flow of news, and the inter-relationship of communication, education and development. Its Commission on Communication, headed by Sean MacBride, has taken communication in its very widest sense. Its biannual General Conference provides the most important regular platform for political debates on communications issues.

Satellites are mostly discussed in the UN Committee on the Peaceful Uses of Outer Space (COPUOS); particularly in the legal sub-committee. There is concern by many developing countries on two points. First, the development of direct broadcast satellites enables one country to broadcast TV programmes into another country, and some countries may intend to broadcast in this way without the permission of the foreign audience. However, the likelihood is small. The ITU's 1977 satellite conference, which allotted BSS frquencies, agreed that a would-be broadcaster should get a degree of 'prior consent' before broadcasting to other countries. Furthermore, COPUOS is near agreement on a stronger statement of the same principle. The US position in COPUOS has been based on 'the freedom of information' and 'free flow'; the USSR position on the notion of prior agreement for every single item that might be transmitted across national boundaries. A series of compromises, generated largely by Canada and Sweden, are much more likely to win approval.

The other satellite issue is somewhat the reverse. Many developing countries resent the success of NASA's Landsat series of remote sensing satellites in discovering facts about a developing country's resources which are then exploited by corporations, etc, in the developed world.

For instance, a Landsat image may show that a patch of land in a remote part of the world may contain mineral deposits. In theory, this information is available to anyone who asks (such open-ness is a condition NASA puts on all owners of Landsat ground stations). In practice the country on whose territory the deposits are sited may not know to ask. A US mining corporation, constantly scanning Landsat data, may get the land on a very cheap option.

The flow of data across national boundaries is another linked issue that bears on the WARC discussions. The transmission of data (financial, personnel, product, etc) from computer to computer across national boundaries is an essential component of modern business. Many European airlines, for instance, operate their booking systems on a large computer in Houston; personnel records of small overseas subsidiary companies are invariably stored in the head office computer in another country. Most European countries, and Australia and Japan, have passed laws, generally based on notions of privacy, which aim to restrict the 'free flow' of data across national boundaries. At WARC, the allocation of frequencies for this purpose is far from a technical matter.

It would be ironic if the new awareness of telecommunications as power, as a social, political and economic force, prevented the ITU and WARC from achieving even the technical agreements that it is traditionally competent to negotiate. But it might. The weight of political controversy could suffocate the technical discussions.

In 1959, telecommunications and that year's WARC were regarded as almost exclusively technical issues. Wilson Dizard, vice chairman of the US delegation, says that the *New York Times* hardly mentioned the WARC at all. This decade, telecommunications has become a political issue, and the media have been full of comment. Typically, the print media have been in the vanguard, while the broadcasters, who are much more involved, have been lazy about informing their audiences. In both industrial and developing worlds, people's expectations have been raised to a very high degree; and, generally the expectations and speculation are political.

There is no doubt that the ITU's constitution and experience make it suited as a forum for technical consensus and highly inappropriate for political conflict. Traditionally, ITU decisions are reached by consensus, not by partisan debate and voting.

Is the ITU's stress on the technical a strength or a weakness? In many ways, the ITU has a good pack of cards. The WARC does not have to start from scratch as did the Conference on the Law of the Sea. It can build on a bedrock of professional expertise and experience. Nor does it have delusions of grandeur as, it might be said, did some of the United Nations' recent conferences on food and habitat.

One of the key factors in this technical-political melange – yet one which is seldom stated – was treated at some length by the ITU Deputy Secretary-General, R.E. Butler, at a speech in May to the Swiss Association of World Federalists. He spoke of the need for countries, especially developing countries, to have confidence in the WARC and its decisions. Glen Robinson, chairman of the US delegation, agreed to some extent when he said that the USA has a 'strong interest in maintaining a working consensus'. The actual feeling of most countries – both developed and developing – as 24 September draws near is probably something akin to 'cautious apprehension'. The words come from the US Congressional Research Service; but

they will find echoes in many delegates, amongst engineers and policy-makers alike.

How does one turn cautious apprehension into real confidence? The answer must lie in the ITU. The WARC may be the single most important gathering of telecommunication planners and plans, but it gets its strength and coherence, and authority, from its position within the ITU's overall scheme of things. These benefits could be tapped in three ways. The WARC itself can concentrate on its business of managing the spectrum. Major individual parcels of allocation and assignment could be done by further conferences in the next few years. And, third, major restructuring of the ITU as an organisation can be done at the 1982 Plenipotentiary Conference (three years is a short time in ITU terms) which will discuss the constitutional questions of spectrum management as the WARC will the technical and administrative matters.

There is already some commitment to further conferences, and more are proposed by various delegations. The CCIR Plenary Assembly, an important fixture in the ITU's regular calendar, is planned for February 1982. The Plenipotentiary Conference will be held in October that year. And the America's conference on broadcast satellite is scheduled for spring 1983. There is a large measure of agreement on the need for special WARCs on mobile radio (proposed by the UK and Sweden, and supported by the Secretary General) and on the high frequencies (proposed by many non-aligned countries). Other proposals speak of a regional conference on VHF broadcasting in Europe, and a world conference on the fixed satellite service (which, the non-aligned countries hope, would draw up a frequency assignment plan).

The task of the WARC, then, is basically fourfold. It should define principles for the use of the spectrum (and the geostationary orbit). It should define the rights and duties of users. It should consider the principles and constitution of the ITU itself and the various mechanisms for international collaboration in the management of telecommunications. And it should reallocate frequency bands in accordance with these principles. These last two cannot be completed this autumn, but they should be more than just begun.

It is a formidable programme. At the kernel of all the ITU's activities lies this question: how should the world use the spectrum to communicate better? The agenda of the WARC itself concerns only bits of that question. But the right answers will enable societies to tackle the rest of it very much better.

What is the spectrum?

The electromagnetic spectrum is a figurative thing – it does not exist until it is used. Its definition expresses the way, therefore, in which it can be used. It is 'the range of rates at which electromagnetic energy can be oscillated'. All electromagnetic waves travel with the same velocity in a vacuum: at 299,000 kilometres, 186,000 miles, per second. What distinguishes the different waves is their oscillations.

Users of the spectrum measure the oscillations of waves in two different ways: by frequency and by wavelength. The frequency measures the number of waves which pass a given point per second, and the wavelength measures the distance between one wave-crest and the next. The shorter the wavelength, the higher the frequency; conversely, the lower the frequency, the longer the wavelength. The relationship is defined by saying that the frequency of a wave is equal to the speed divided by its wavelength.

The spectrum ranges from the smallest possible frequency to the largest possible. One cycle a second is known as one Hertz, after the German pioneer Heinrich Hertz. One thousand cycles a second is known as one kilohertz (1 kHz); one million as one megahertz (1 MHz) and one thousand million as one gigahertz (1 GHz).

At the smallest possible frequency, under 10 cycles a second, the waves are 300 million metres long. These frequencies cannot be heard or seen, and are too low to be used for radio.

The audible frequencies range from 50 to 18,000 cycles a second (or about 100 to 10,000 for older people).

The radio spectrum extends from about 10 kHz to about 300,000,000 kHz (or 300 GHz). The usable spectrum is divided into bands (see chart). These bands are simply groups of frequencies; they have no technical or permanent connotations. At present the ITU regulates the spectrum from 10 kHz to 275 GHz, although the upper parts of the spectrum are not yet allocated.

The development of telecommunications can be seen as a constant push to use higher frequencies, because the higher the frequency the greater the capacity to transmit information. Today's increased traffic and news services need more frequency space or bandwidth. For telex, a few hundred cycles per second might be sufficient. For telephony, more is needed: and for television very much more. One colour television channel generally requires as much space as occupied by one or two thousand telephone circuits.

The capacity of the different frequencies can be best compared in terms of the bandwidth necessary to carry a colour TV signal (eg, 6 MHz). The same capacity could also carry about 40 FM radio channels, 1,000 AM radio channels and 1,500 telephone circuits.

Microwaves are defined as radio waves with wavelengths between 1 millimetre and 30 centimetres, and frequencies between 3×10^{11} and 10^9. Higher up still is the visible spectrum (red, orange, yellow, green, azure, blue, violet), shouldered by infra-red and ultra-violet. The visible spectrum is a very small part of the entire spectrum. The light waves range from lengths of 7×10^5 centimetres down to 4×10^5 centimetres. Their frequencies are about 10 million GHz.

Yet higher up the spectrum are X-rays and gamma-rays, with wavelengths shorter than one-millionth of a centimetre.

The radio spectrum

Wavelength	Frequency	Band
100 km	3 kHz	
		VLF very low frequency
10 km	300 kHz	
		LF low frequency
1 km	30 kHz	
		MF medium frequency
100 m	3 MHz (3000kHz)	
		HF high frequency
10 m	30 MHz	
		VHF very high frequency
1 m	300MHz	
		UHF ultra high frequency
10 cm	3 GHz (3000 MHz)	
		SHF super high frequency
1 cm	30 GHz	
		EHF extra high frequency
1 mm	300 GHz	

The International Telecommunication Union (ITU) is the oldest of the 'modern' international organisations still surviving today. In fact, it pre-dates the UN by some eighty years, since the original International Telegraph Union was set up in 1865. Then, it was mainly an organisation of European states, some of which have since disappeared as autonomous units. Now 154 countries are members.

The ITU regards itself as an 'international parliament for laws on all aspects of telecommunications' (IFRB Seminar on Frequency Management, 1978, 1/78). As all parliaments, it has developed its own ways of going about its work.

For historical reasons (partly longevity itself, and partly the need to adapt to rapidly changing technologies) the ITU has a complex structure and decision-making machinery – too complicated, in the eyes of some observers. Its supreme body is the Plenipotentiary Conference which meets irregularly about every five years. The ITU does not have a charter or constitution (as do more recent international organisations like the UN, UNESCO, FAO, etc) but a convention, the International Telecommunication Convention, the basic international legal instrument of the Union. Each Plenipotentiary Conference has to revise and, above all, re-adopt this convention. The last Plenipotentiary Conference was held in 1973 at Malaga-Torremolinos and the next will not be held until 1982 in Nairobi. Between the conferences, an Administrative Council of 36 elected members, which meets once a year, acts on behalf of the conference.

Attached to the International Telecommunication Convention are the so-called administrative regulations: the Radio Regulations, governing all forms of radiocommunications, including space communications, and the Telegraph and Telephone Regulations. The regulations are adopted by administrative conferences which may be convened at a regional or world level.

The Regulations run to 1,473 pages in two volumes. They include definitions (article 1), the Table of Frequency Allocations (5), the rules for the notification and registration of frequencies by the IFRB (9 covers terrestrial assignments, 9A covers space assignments); the HF bands between 4,000 and 23,000 kHz allocated exclusively to broadcasting (10); and so on. There are 45 articles in all.

Article 5 contains the Table of Frequency Allocations. The table ranges from 10 kHz to 275 GHz; in the current issue of the Radio Regulations, it fills 117 pages. Each band of frequencies (a band is simply a group of frequencies; the word has no permanent or technical meaning) is allocated to one or more services. In all, there are about 20 services, (eg, broadcasting, radio astronomy). Sometimes a band is allocated exclusively to one service; sometimes it is shared amongst services; if shared the table may indicate that one or other service is the primary service.

That makes up the table proper. However, many allocations have 'footnotes' which modify the allocations. Footnotes are indications of reservations (one country may disagree with an allocation) or a recognition of a special case. The number and complexity of footnotes has increased enormously in the past few years.

In ITU terminology, the words 'allocate', 'allot' and 'assign' have a precise technical meaning. Frequencies are allocated to services, allotted to areas or countries

and assigned to stations. The job of the ITU is to allocate and allot; individual governments assign.

The ITU works through permanent bodies. The General Secretariat is headed by a Secretary-General currently Mohammed Mili, from Tunisia. The Secretary-General and his Deputy are elected by the Plenipotentiary Conference. However, in the ITU the responsibilities of the Secretary-General are different from those in other international organisations because of the relative autonomy of the other permanent bodies.

The International Frequency Registration Board (IFRB), which was set up in 1947, consists of five independent members, also elected by the Plenipotentiary Conference. They do not represent their respective countries or regions but serve as 'custodians of an international public trust'. This trust concerns the radio frequency spectrum. The IFRB records all the frequency assignments made by individual countries and checks their conformity with the Radio Regulations and decisions made by administrative radio conferences. On this basis the assignments can be given formal international recognition and protection – or be refused such recognition.

Finally, there are two permanent international consultative committees, the International Radio Consultative Committee and the International Telegraph and Telephone Committee (CCIR and CCITT, the acronyms of their names in French). Their main duties are to study technical, operating and tariff questions and to issue recommendations. These recommendations are not binding but command widespread adherence.

In overall terms, the ITU performs four major distinct functions: A rule-making or legislative *function is carried out by the Union's Plenipotentiary Conference and by the Administrative Conferences with regard to the general principles of international telecommunications regulation, the allocation of frequencies, the elaboration and adoption of plans regulating the use of frequencies for certain services and the adoption of procedures for the notification of frequency assignments at the national level; rules concerning international protection, etc.*

A regulatory *function is performed by the IFRB. The registration of national frequency assignments and the procedures for settling disputes between countries involve the interpretation of the complex Radio Regulations. This task confers upon the IFRB important quasi-judicial functions.*

A third function is the establishment of technical standards *and operating procedures which are carried out by the two Consultative Committees, CCIR for radio communications and CCITT for telephony, telegraphy and for such services as data transmissions.*

As a fourth function the ITU administers, *as executive agent for the United Nations Development Programme (UNDP) and the World Bank, extensive technical assistance and cooperation activities for developing countries.*

At its most recent session in June the Administrative Council approved a 1980 budget of Sw. Fr. 78 million (£20 million), only one million more than the 1979 figure. In addition, the ITU dispenses UNDP and World Bank monies of around £20 million.

The ITU is based in Geneva, where it employs 600 people. Its headquarters is at the Place des Nations, CH-1211 Geneva 20, Switzerland (tel: 022 99 51 11).

Notes

This preview of WARC is part of the IIC's WARC programme and follows several IIC meetings and earlier texts and articles.

The main official sources of ITU material that are relevant to WARC are:

i *The International Telecommunication Convention*, Malaga-Torremolinos, ITU, 1975.
ii *The Radio Regulations*, ITU, Geneva, 1959, revised.
iii Papers of the ITU's *IFRB Seminar on Frequency Management and the Use of the Radio Frequency Spectrum and of the Geostationary Orbit*, Geneva, October, 1978.
iv Papers of the ITU's *Special Preparatory Meeting*, CCIR, Geneva, October/November, 1978.

The other official source of WARC material is the various national proposals. Some countries have published their proposals; a few have not. Two of the most substantial and accessible proposals are those made by the USA and UK. In the USA, the Federal Communications Commission has published its recommendations in Docket No 20271 (ref: 78-849, 4652), available from the FCC, Washington, DC 20554. The final US proposals, as submitted by the Department of State, have been published by the ITU as conference documents 40-50 inclusive.

The UK has both the major *UK Proposals for WARC 1979* (Home Office Radio Regulatory Department, Waterloo Bridge House, London SE1) and the smaller *Supplementary UK Proposals for WARC 1979* (same source). A separate document, *Preparation for the WARC 1979* (same source) gives a brief introduction to the proposals.

The IIC preparation for the issues raised by the WARC has led to several publications:

i *Telecommunications: National Policy and International Agreement: A Briefing Paper for the 1979 WARC*, IIC, London, 1977.
ii *Report and Papers of an Asian Seminar on the 1979 WARC*, IIC/ECA/KAF/URTNA, published by United Nations, Economic and Social Council, ECA, E/CN.14/Tel/14.1978.

Of the many papers and articles published, the following are notable:

i Heather Hudson, *WARC 79: Development Issues and Options*, Academy for Educational Development, Washington, DC, 1978.
ii A.M. Rutkowski, 'The 1979 WARC: The ITU in a Changing World', in *The International Lawyer*, Spring 1979.
iii W.M. Pannell and others, *A Study of the Future Frequency Spectrum Requirements for Private Mobile Radio in the United Kingdom* (Pye Telecommunications, Newmarket Road, Cambridge, 1976).
iv *Report and Conclusions of the Meeting of Representatives of Telecommunications Administration of Non-Aligned Countries in Preparation for the WARC 1979*, Yaounde, Cameroon, May, 1979.
v US Department of State, *International Communications Policy*, US Government Printing Office, Washington.
vi 'The US Faces WARC', in *Journal of Communications*, Annenberg School of Communications, Philadelphia, Winter 1979.
vii The various proposals by the regional broadcasting unions (EBU, OIRT, ABU, ASBU, OTI, etc).
viii *WARC 79 and the Global Spectrum Problem* (Communication Studies and Planning Ltd, Circus House, 21 Great Titchfield Street, London W1, and Kalba Bowen Associates Inc, 12 Arrow Street, Cambridge, Massachusetts 02128). A comprehensive, informed, £2,000 study.

Applying a new concept of development

Joao F. da Costa
Secretary General
United Nations Conference on Science and Technology for Development (UNCSTD)

This August the United Nations is holding another of its massive intergovernmental conferences to draw the world's attention to a global issue, and to stimulate governments and private organisations to action. Previous conferences have dealt with the environment and population, and the habitat (which inspired the phrase, 'mega-conference'). This year, the topic is science and technology for development. The conference (held on 20-31 August, in Vienna), its preparations and results, are a major attempt to improve the understanding and use of science and technology in, especially, developing countries.

Science and technology touch on the most sensitive areas of national development: commercially, culturally, legally, and politically. The idea of UNCSTD *was to shift the attitudes and activites of some of the most powerful actors on the global stage: national governments and transnational corporations. It was also to make changes to the* UN *system, so that science and technology could more fairly and easily be used for development. For a* UN *conference to combat such powerful financial interests and also to propose some quite radical change to the organisation which supports it, shows great ambition. As Joao de la Costa says in his article, the results may not be known for some time.*

A variety of efforts have been made by different national and international organisations, for a third of a century, to reinforce the *real* independence of developing countries and reduce the inequalities between the living standards of peoples of the world. But only modest progress have been achieved. During the same period aspirations toward better lives have been stimulated by easier communications, high educational levels, and more travel. The developing nations have realised that, not only are they not moving ahead quickly, but they are actually losing ground in comparison with the more prosperous nations. They concluded it was unlikely they could speed the pace of improvement without resolve.

That action was taken by the UN General Assembly at special sessions in 1974-1975 when it voted to call for the establishment of a new international economic order. Secretary-General Kurt Waldheim succinctly set forth the reasons for that call in a speech early in 1975.

Many new nations, he said, having won political independence, find themselves still bound by economic dependency. For a long time it was thought that the solution to this problem was aid and assistance. It is increasingly clear, however, that a new international economic order is essential if the relations between the rich and poor nations are to be transformed into a mutually beneficial partnership. Otherwise the existing gap between these groups of nations will increasingly represent a potential threat to international peace and security.

Moreover, the dependence of the developing world upon the developed is changing – indeed, in certain cases it has been reversed. Many developed nations are also finding themselves in serious economic difficulties. The international system of economic and trade relations which was devised 30 years ago is now manifestly inadequate for the needs of the world community as a whole. The charge against that order in the past was that it worked well for the affluent and against the poor. It cannot now even be said that it works well for the affluent..

The objectives of the new international economic order are meant to be in the interest of all. They are, quite simply, to bring the distribution of economic resources and power into a greater degree of balance and to allow less-developed nations to achieve higher living standards. These aims were to be accomplished both by national efforts, and by co-operative initiatives taken with other countries.

Science and technology were thought to be the key elements in bringing about such improvement by the advocates of the 1974 resolution. Summarised briefly, the main areas in which science and technology were to be put to use in bringing about the new order were these:

- Developed and developing countries were to co-operate in creating and advancing the scientific and technological facilities of developing countries.
- Developed countries were to expand significantly their support of scientific and technological programmes in the developing countries.
- The developed countries were to increase substantially their research and development devoted to the specific problems of developing

countries and to creating local technological capabilities.

- Steps were to be taken to assure that scientific technological relations among states took more cognizance of the needs of developing countries, especially in the field of technology transfer.
- Measures to aid developing countries in achieving self-reliance and internally-generated economic growth were to be encouraged.

Eschewing the formal language of resolutions, the major objectives could be summed up as: making the developed world's research and technology more readily available to developing nations, stimulating more locally useful research in the developing nations, directing more of the developed world's research toward the needs and concerns of the less-developed countries, and fostering self-reliance. The Conference on Science and Technology for Development, called by the General Assembly of the UN, therefore corresponds precisely to the scientific and technological dimensions of the new international order.

Awareness and negotiation

Before discussing the conference, it should be noted that past conferences held by the United Nations have made material and significant differences in world opinion on a number of the most fundamental issues of this century.

Each of the issues chosen as the topic of a United Nations international conference has been a matter of central concern to the world community. The Conference on Science and Technology for Development grows out of the others, and is a culmination of them: it deals with the getting and spending of national livelihoods, the training of people, and the acquisition and sharing of the skills and knowledge required to thrive in an increasingly technological world.

United Nations specialised conferences may be characterised by either or both of two main features. The first is that of raising the awareness of national and global public opinion, particularly that of the decision makers and the different groups which constitute the vital forces of society. The other is that of negotiation. The conference, and particularly the preparatory work for it, serve as a forum for efforts to arrive at agreed common positions and actions. Such conferences as the World Conference of the International Women's Year (1975), the United Nations World Population Conference (1974) and the scientific conference of 1963 were mainly concerned with the former of these two aspects; others, like the Conference on the Law of the Sea, were concerned with the latter.

I think the United Nations Conference on Science and Technology for Development was intended to play both roles. The first has largely been achieved, since there has been considerable fall-out from the preparations for the conference at the national, subregional, regional, interregional and international levels. The problems involved in the application of science and technology to development are much better known in member states today than they were two years ago – and I am not talking only about developing countries. Moreover – and this is an essential point – the preparations for the conference have forced groups which usually have nothing to do with each other (administrators, scientists, engineers, public and private enterprises, workers, the representatives of the different parties to the social contract) to work together in a co-ordinated way leading to fruitful interaction. The conference itself will certainly be decisive in helping to continue this co-ordination and interaction on the international plane. All this fully justifies the money, the time and the intellectual effort that have been spent on this operation.

Let me add that the preparatory process will have had one other very important result; namely, a refining of the concept of development, which is so difficult to grasp. To my mind, it has shown that the real frontier of development is not crossed until social and economic dualism has been eliminated and creative and innovative capacity acquired or regained. Unless these two conditions are fulfilled, we can speak only of fragmentary and patchy development, which may make the countries even more vulnerable, dependent and unstable than they are at present; I shall come back to this point later.

But it is also hoped that the conference and the preparations for it would provide an opportunity for negotiation on the action required to ensure fruitful application of science and technology to development. This is in the spirit of the General Assembly resolutions that govern our activities.

The new concept of development

Preparations for the conference involve a new concept of development which might be summed-up in the following way:

1. Development must transcend purely economic dimensions in order to include social considerations – food, health, living conditions and employment – and the whole dimension of cultural and spiritual self-realisation embracing creativity, quality of life, and the rights of man.

2. Development is seen as something original; which is to say that imitation of models is undesirable. Styles of development should not only be diverse and respond to country-specific economic and current social structures, natural and human environment and cultural integrity, but should also be in accordance with the objectives of each country and the way it perceives its own future. In this sense, the notion of 'gap' between developed and developing countries acquires a different significance. Without rejecting a linear approach, and with the objective of reducing sharp contrasts in standards of living, we should strive to abandon the limited concept of 'gap' which is usually somewhat negatively defined on the basis of external indicators and instead substitute a positive and voluntary strategy of development.

3. Development must be self-determined and self-generated. This applies not only to the capacity for selecting a developmental style, but also must assure that national identity will not be jeopardised by its introduction. Often, of course, self-sufficiency can only be obtained on a larger scale than that of an individual nation.

4. Full self-reliance cannot be achieved by national effort alone. Often and even in most instances, self-reliance is achieved within a broader framework either 'horizontally' by co-operation among developing countries, or in a 'triangular' pattern; that is to say, with the added participation of developed countries. In this sense, development must be co-operative.

5. Development must respect the integrity of the environment (both natural and cultural) as well as the traditional structures of a country which are often necessary for the conservation of its social cohesion. This includes the safeguarding of the national heritage and protection against all forms of imposed alien values.

6. Development must be planned and requires constant attention from, and intervention by, national authorities. It appears to be generally accepted that the free play of economic forces does not automatically lead to an equitable diffusion of scientific and

technological potential, but instead leads frequently to concentration and polarisation within a country in highly developed centres. The alignment of the interests of private enterprise with national objectives needs to be ensured by appropriate mechanisms. Science and technology need to play a direct and active rather than passive or intermediary role in development. That is to say they should be linked and integrated with national supply and demand.

7. In particular, development needs to be directed towards a just and equitable social order which requires for its establishment, in general, structural transformations allowing for the participation by all sectors of the population in the benefits of science and technology, and not only their negative effects. In other words, it is not merely a matter of modifying relations between states, but also of making social and economic adjustment within societies.

8. Development must be democratic in another sense. It must respond to the choices made by the population as a whole. The idea that technological decisions must be imposed on people should be categorically rejected. Application of science and technology is not the exclusive aim of society. They must not pass out of man's control to the degree that he loses liberty and determination of his own destiny.

9. Development must be competitive. It should not bring about regions placed, as it were, in 'reservations', but should make them all participate actively in a new optimal division of economic labour which is the heart of the objectives of the new international economic order.

10. Development must be innovative. It must neither depend on the importation of outmoded technologies from developed countries, nor even advanced technology developed somewhere else. Only the mastery of world scientific knowledge (including that knowledge which for economic reasons has never been applied in developed countries) can assure a genuine, self-generated technical development.

11. National economic planning must be based on a realistic definition of national needs and on consumption models that are consistent with the national characteristics of a country including its national resources. National economic planning should be achieved through the integrated integration of science and technology with production activities.

The outcome of Vienna

The conference is not merely a two-week event. It is a process that began years earlier and will continue to live on after the Vienna meetings. It is important, therefore, that observers apply caution in judging the success or failure of the conference.

Success or failure should not be judged by the apparent degree of consensus; not by its immediate impact on national or international action. It should not be judged by the establishment (or not) of new international institutions, funds, or the like. It should not be judged by the inclusion or exclusion of any particular philosophy.

It should be judged, rather, by the longer-term impact of the conference process as a whole on national awareness and activities in applying science and technology to development and on the actions taken to attain self-reliance.

The Vienna conference will have been a success if all of us, individuals, international secretariats, governments, national and international or non-governmental organisations, achieve a commitment to the rational application of science and technology to the real problems of development, and then work to translate that commitment into action. Such action will constitute a major element in establishing a new international economic order.

It is hoped that a set of 'rules of the game' for governing the employment of science and technology in furthering the new international economic order will emerge. These rules should, among other things, seek to eliminate the imbalances among nations which have affected the international system.

In the area of organisation, almost all of the national papers prepared for the UNCSTD criticised the lack of co-ordination within the United Nations system. The conference sought, therefore, to improve the procedures for joint planning. It asked whether there should be an international mechanism to promote the planning and implementation of the programmes and to secure the required financial resources.

The conference also aimed at decisions on some means of solving the global problems that affect the entire human race: problems such as energy, population, and environment. Other problems demanding solutions are under-development, world poverty, and ways of keeping the peace and controlling the armaments race. All these have to be dealt with in an inter-related way, as they are inter-dependent.

The conference cannot do the impossible. It should in fact be considered a success if it succeeded in identifying the solutions to some of the more serious problems and defining the mechanisms for solving them. We are all in accord that this conference must serve a common interest. And, undoubtedly, delegates, both from developed and developing countries, are gradually coming to realise that they have many more interests in common than initially envisaged.

This realisation is appropriate for the nations of the world, their leaders, and their peoples, as the planet prepares for the long step forward into the Third United Nations Development Decade, the decade of the 1980s.

PROPOSAL: *A media policy*

Edward Ploman, Executive Director, IIC

The formation of today's policies on media and communication cannot rely only on traditional thinking. Fundamental questions must be asked anew.

They can be boiled down to this single issue: in an interdependent world, characterised by a series of unprecedented challenges and crises – of energy and pollution, of population and resources, of technology and development, of social transformation and human adaptability – what kind of communication systems and information services do we need?

All societies find themselves in a new situation, all now face difficulties in coping with new issues and problems. Communications is no exception. So far, national efforts to deal with communications and information policy issues in a comprehensive or coherent manner are rare at all relevant levels: in terms of the development of new technologies and the introduction of new services, in terms of reflection and understanding, and in terms of providing social instruments for decision-making. Communications policy and planning are high on the political agenda – but haphazardly, without an overall view and in an atmosphere of general confusion.

In the last few years, a striking response has been the proliferation of public investigations, inquiries and reports. Some have looked at general issues, others at particular services or problems. In most cases (there are definite exceptions) the results have been less than satisfactory. Sometimes the mandates have been too limited; sometimes the committees themselves have chosen to restrict their focus.

The West German committee on the future of the technical telecommunications system (known as KtK) was appointed by the federal government and therefore could not consider broadcasting, which is the responsibility of the Lander; yet its main concern was the development of cable networks, which obviously has prime importance for the future of broadcasting. In the UK, too, the Royal Commission on the Press, the Committee on the Future of Broadcasting, the Interim Action Committee on the Film Industry and the Committee on Designs and Copyright Legislation were active at the same time, but with a minimum of coordination between them. At one time, some ten Swedish committees on communication issues worked simultaneously.

Another common shortcoming is the lack of a coherent framework or, in a different perspective, the absence of an adequate perception of a general context. It is striking that the report of the Annan Committee in the UK, whose official mandate concerned the future of broadcasting, did not include any serious consideration of the future political, social or cultural context of broadcasting. The equivalent Swedish committee on the future of broadcasting did include some references to possible future developments in society, but only in a rather desultory and insufficient manner. The US Carnegie Commission, and the discussions of a reform of the 1934 Communications Act, had similar weaknesses. This characteristic is strangely enough typical of almost all the numerous investigations into the future developments and structure of the media or other communications sectors.

Typically, inquiries into the media often start with questions that are no more than reactions to developments. What are we going to do with a second, third or fourth television channel; or with videograms; or with satellites? This approach is simply trying to catch up with the scientists and technicians who have given proof of a great technological imagination which in no way has been matched by a corresponding social imagination.

In one perspective, then, the objective should be to reverse this trend. New devices and systems are constantly being developed for manufacturing, industrial or commercial considerations. Uses have to be found or created, instead of needs and requirements being formulated to serve as the basis for the development of technology.

Much attention is lavished on policies, structures, and regulations adopted for various media. However, these policies are often formulated and implemented by different bodies, in pursuit of limited, uncoordinated and often contradictory objectives. The lack of coordination becomes serious when media and communications policies, whether implicit or explicit, are not linked to overall socio-cultural policy, or policies in other sectors.

It might well be that we cannot avoid and have to live with contradictions; even a certain disorder. But this should also be the result of a conscious decision and not just happen by default. We should choose which aspects of communications can or should be regulated and which cannot or should not. We should choose where and how we can afford a disorderly, free play of forces, and where we require a coordination of policies.

The main thrust of this article concerns the need to consider media in a wider perspective. Indeed, the term and meaning of 'media' may itself be unsatisfactory, and inappropriate to the task.

Mass media: a dubious concept

The concept of the 'mass media' is linked to concepts of mass production, the mass market and so on; it is bound tightly to a particular era of industrialisation, and to particular arrangements of producers and consumers and other interest groups. The term has been adopted by the branch of sociology that became known as mass media or mass communications research, and which is based on a particular paradigm and view of the communication process.

One implication of this mass media concept is to consider the public as an object and not as a participant in a communications process. This trend, in turn, has resulted in a concentration of interest on the media institutions in terms both the organisation of the media and of the rights – much less than the responsibilities – of the media professions. Mass media policy is therefore mainly the policy of mass media institutions.

New insights and paradigms in the field of communications make the concept rather dubious. It has been shown that the concept of an undifferentiated, mainly passive, mass media public is misleading in the sense that individuals and groups use the mass media in very different ways depending on their psycho-biological conditions, educational level, social status and many other factors.

The individuals who make up the public whom the media are supposed to serve seem often to enter mass media policies as no more than the objects of research programmes, and polling. It has suited the media and the researchers working within this paradigm to use such abstractions as 'the newspaper reader', 'the radio listener' or 'the television viewer', which disregards the fact that people will use all available media or channels of communication, and in different ways and combinations.

In fact, even in terms of actual patterns of use, the mass media concept is now being stretched to a point where it becomes meaningless. At one end, 'mass media' are beginning to abut on, or even to merge with, communications modes that traditionally have been classified as telecommunications or computerised information services (videotex, teletext, teleconferencing, 'mass informatics', etc). At the other end, the 'mass media' are evolving into more individualised patterns which are more correctly described as group or mini-media (alternative/independent press or cinema, community video, etc).

The important aspect of scale is often not sufficiently considered. It is debatable, for instance, whether local broadcasting should be seen as a mass medium at all. Yet the expression is now used to cover, without any reference to the all-important notion of scale, the most different circumstances. The term 'local broadcasting' in countries like the UK and USA is used to indicate a broadcasting service that may cover a population of 12 million people. In other countries, the *national* service may not reach so many; and *local* broadcasting denotes a different phenomenon with regard to its scale of operations, and thus in terms of community orientation, access and participation.

There are other difficulties. The three sectors of traditional public communication systems have been the mail, or postal services; telecommunications, mainly the telegraph and telephone services; and broadcasting. But the technologies of each system, and the services they provide, are beginning to converge and overlap. Several new divisions have been proposed: between services that are publicly available, and those that are private; between print and electronic services; and so on. But the varieties of systems and services eludes classification.

The confusion makes it even more unrealistic to consider any medium or communications system in isolation. The most obvious reason is that action – or lack of it – in one area will have implications, often of an unexpected kind, in other areas. Decisions on the mail will affect the distribution of newspapers and other media that require physical support. The planning of the telecommunications network will affect a number of existing and future services – and the other way around. There is thus a need to consider a series of basic issues in the light of the different settings which together constitute the overall context. A number of these contextual settings will now be explored.

Technological clutter

The most obvious feature of the present communications scene is the paraphernalia of technical devices which decorate – or clutter – our environment, each serving a single isolated purpose: telephones, radio receivers, record players, photocopiers, teleprinters, typewriters, television receivers, audio discs, video cassettes, video discs, cameras, etc. Each piece of equipment is destined for one one communications purpose, for one service only, which usually is associated with a specific transmission or distribution system, each with its own institutional and legal framework, and means of financing.

To some extent, these gadgets and services have been conceived within and fitted into the traditional categories, such as telecommunications, the mass media, print, photography etc. None of these categories seems to have a firm theoretical or practical basis and in fact each is crumbling under the impact of new technologies and services. The confusion in reactions and evaluations clearly shows up the lack of a generally accepted conceptual framework.

It would seem more constructive therefore to make an attempt to discern some of the major trends in the development of new technologies and services. It is an accepted fact that one of the characteristics of the new communications technology is a vast increase in the capacity to generate, transmit, receive and store information. However, there are other trends which appear to be even more relevant and important.

The flexibility of the new technologies is one of their most obvious and stimulating qualities. For TV distribution we can now choose between, one, traditional over-the-air systems; two, cable systems (twisted pairs, coaxial, or optic); and, three, the mail, for the delivery of pre-recorded cassettes and discs. And as well as these terrestrial systems we have an entirely new category of space delivery systems.

Specific kinds of content have also changed. Originally, 'news' was distributed orally, then by handwriting, then by print; even later, by film, radio, television. Each medium filters the news according to its own characteristics and constraints. These patterns are now changing yet again. Texts and graphics can be distributed electronically, and either displayed electronically or as a printed 'hard' copy.

The expanding TV set

Even the television set, which has been used so far for one purpose only, is expanding into new formats. It may rightly be seen as a most under-used piece of electronic equipment. Now there are new possibilities beyond the mere reception of over-the-air broadcast television; the set can be used for the playback of videograms, for home video, for one-way or two-way cable services, for the reception of satellite transmissions, for electronic games, for the reception of teletext services, for access to videotex services and to audio-visual archives; and there is more to come.

It was therefore a serious mistake to call this piece of equipment a television receiver. A much more adequate description is a visual display unit.

Another aspect of today's flexibility relates to the possibility of combining different techniques and services and the trend, which some regard as the most important of all, towards integration at all levels.

Integration takes place, first, at the basic technical level. The introduction of digital transmission techniques means that all input, whether voice, data, or image, is transformed into the same kind of electronic signals. There will be no need for separate transmission networks, which in turn implies a new freedom to organise services according to other than technical criteria.

The next level concerns the combination and integration of services. Television and facsimile combine in telefacsimile; computers and publishing result in electronic composing and printing; the combination of television and telephony is at the origin of the videophone and, together with computerised data systems, results in teletext and videotex.

At the next higher level, one can discern the beginning of the integration of overall systems. The combination of telecommunications and computers constitutes the basis of informatics. In fact, videotex systems represent one further step through the combination of telecommunications, computer and broadcasting systems. It is also possible to envisage other combinations: electronic mail (combining computers with telecommunications and electronic home equiment); electronic press and publishing; new forms of library-archive-documentation services, etc.

The final outcome of this trend has already been described as a worldwide 'electronic highway' or 'the wired society': a totally integrated global network providing all currently available services and a host of foreseen and imagined services. Each individual would have access to the network when he wishes and, more importantly, how. The user would be able to choose his mode of communication, voice, data, image, or combinations according to his purpose.

There is, inherent in these developments, a contradiction. The system itself will have to be established on the basis of centralised planning, investment and operation, yet it is supposed to provide for highly individualised patterns of use.

Also, the entire trend towards overall, integrated configurations meets another trend in the opposite direction, a trend towards decentralisation, individualisation, in concept and in use. This trend is obvious at many levels; in the cheapness and easy availability of micro-electronic equipment; in the demands for the use of new technology for local broadcasting; in the various groups who have taken electronic communications out of the mass media sphere and transformed them into individual or group media of expression (similar to what had already happened in the cinema). It is significant that fears have already been expressed in two opposite directions: fears of the integrated global village and fears of the utter fragmentation implied in everyone doing his own thing.

Obviously, the function of media and the impact of new technology varies with the general political and social context. So do communications and media policies. However, there are some shared parameters; for example, the significance for a national media policy of a society's attitudes on centralisation and decentralisation, or of the balance to be struck between the public and the private sectors.

The harmful effects caused by the absence of a coherent social policy can be seen in the imbalanced, inequitable deployment of new technology and services within and between countries. Within the industrialised societies new capacities are being made available; but the benefactors are mostly certain elitist institutions and groups in society and generally not the public at large. New means for dealing with information are in use, often in conjunction with special, private transmission networks operated by business enterprises, by the police and the military, by government departments, by universities and research centres and by other strongly organised groups.

These organisations are able to pay for new systems and services tailored to their requirements. The individuals who make up the general public are often left with over-extended and deteriorating public networks. In developing countries, the differences in availability and access are even more pronounced. The inequalities between countries are what the demands for a 'new international information order' are all about, but a new international 'order' cannot be achieved without new national 'orders'.

More public choice

In one perspective, media and communications policy concerns decisions about the allocation of resources, which are eminently political and not only technical decisions. As in other areas, all countries have to cope with a trend towards a growing politicisation of issues. This expression is here used to mean that increasingly what earlier were regarded as natural or social constants (such as sources of energy, climate, genetic structures) are becoming subjects of social choice. As new social issue areas they become subordinated to public, societal choice rather than being left to private, individual choice.

This trend towards putting an increasing number of issues and activities within the area of conscious social choice and public, as opposed to private, decision-making is a marked feature of the communications and information sector. It seems to be true of all countries, even those professing a basic adherence to a liberal creed, that, as far as possible, the communications sector should not be left to private initiative, or to 'natural forces'.

With regard to the economic aspects of the media, and of communications generally, two different perspectives should be considered. Both are recent and still to a large extent unexplored. The first is the actual total costs of various media in a national, macro-economic perspective; the second is the economic importance of all information activities in society in terms of the information economy.

Evaluations according to the first perspective are almost never undertaken. Generally, media costs are calculated on a partial basis; a typical example is that the costs for broadcasting are usually estimated only in terms of the costs of production and transmission. The costs of reception, which are far greater, are seldom included.

An attempt to estimate and analyse overall costs for the whole of a national sector of mass media in social economic terms was recently undertaken by Sveriges Radio. The assessment of these costs was related to the volume of media consumption. Particularly interesting is the comparison of costs per hour of consumption for different media (see *InterMedia*, Vol 6, No 5).

Another technique is to aggregate the information activities in a given society. In industrialised societies, the computer, telecommunications and other electronic information industries are taking on a continuously increasing economic importance. According to one study this complex of industries has already developed to a level where it is the third largest in the world economy. Related analyses point to what has been termed the shift from an industrial society (based on energy) to a post-industrial society (based on information). In this view, the industrialised countries are moving towards a new stage of socio-economic organisation where the communications and information sector becomes economically the single most important sector in society. In a study of the US economy the resources consumed in producing, processing and distributing information goods and services were shown to make up 46% of GNP; and nearly half the labour force to hold some sort of an 'information' job, earning 53% of labour income (Marc Porat, *The Information Economy*, US Department of Commerce).

These studies have introduced such new concepts as the 'primary information sector' which includes those firms which supply information goods and services exchanged in a market context, and the 'secondary information sector' which comprises all the information services produced for internal consumption by government and 'non-information' firms. To the former belong industries which produce information hardware or software for distribution or sale as a commodity, including management, consulting and legal services, education, libraries and information services, and the mass media. The latter sector includes most of the public bureaucracy and all of the private bureaucracy; bureaucracy in this context is described as an information-producing, distributing and consuming organisation.

According to such an economic analysis the production and transfer of information is not only a commodity, but can almost be likened to a burden – indispensable, to be sure – that has to be supported by the rest of the economy. Information, in one perspective, has a measurable market price. In another perspective it constitutes a growing part of the national economy.

The cultural context

It is always difficult to identify the most important features of one's own time, as witnessed by the many labels given to our age and modern society. It seems increasingly obvious that a strong case can be made for the view that we are living in an era which may come to be known in history more for the enormous expansion of communications facilities and information flows than for any other development.

It has become almost a truism to speak of the communications revolution, the information explosion, or the information economy. However, the expressions themselves are significant in that they point to a profound change in our attitudes to the entire communications/information complex. Even though communications issues all through history have received their fair share of attention, communications and information were largely taken for granted and seen as processes functioning in support of other social activities and goals, which were judged to be more fundamental, whether they were expressed in religious, economic, or political terms. It is only in recent years that there has occurred a change in perspective so that, for the first time, we are becoming self-conscious of communications, and information issues and communications per se have become an issue in society.

It is this change in perspective that has led some observers to analyse the advent of electronic communications as a fourth communications revolution, alongside and of equal importance as the three earlier ones: the invention of speech, the invention of writing and the invention of print. Similarly, the movement towards the all-pervasive use of sophisticated communications devices is compared to the transition man made from hunting to agriculture or, more recently, from agriculture to industry.

Communications is now seen as crucial in social life, even as the one common feature of organised communities. There is a new sense of the relationship between social structures and patterns of communication, between information and power. Communication and information are seen as a commodity resource in society and analysed with regard to national economies and in terms of social and individual needs.

New approaches

The main thrust of the observations presented in this article concerns the need to consider the media in a wide perspective, and in relation to a number of contexts all of which are interrelated. One issue and one situation, chosen among many, will have to serve as an example of the kind of questions that now must be asked and the kind of thinking on policy that is required.

There is a growing realisation that many of the policies pursued by governments, often not by choice but by perceived necessity, do not find the required support among the population. While governments have to pursue policies in a complex, interdependent world, where many of the national problems require international solutions, there is in many countries an increasing gap between those public attitudes that are necessary for constructive policies to be adopted and the actual attitudes of many of the public.

The energy crisis in many industrialised societies is conditioned by the refusal of the general public to believe and to act in keeping with the necessities perceived by the policy-makers. In developing countries the immediate, urgent needs of economic development are often opposed to more long-term and equally important ecological requirements.

An extremely relevant initiative is what in the UK is called 'development education'. This expression is used to describe those processes of thought and action which increase understanding of worldwide social, economic and political conditions, particularly those which relate to, and are responsible for under-development. In a recent report, *Development Education*, by the Advisory Committee to the Overseas Development Administration, the emphasis is on the need to take action with regard to attitudes towards developing countries which 'are confused by stereotype images, post colonial guilt, racial and cultural prejudices, limited, unbalanced knowledge, concern about future employment, the belief that overseas development is synonymous only with aid, and that aid is motivated only by charity. Compared to a similar survey done in 1969, it is a deteriorating picture, and shows new resentments towards previously "subservient" nations acquiring new wealth and power.' In another part of the same report, mention is made of the public's attitudes presenting 'a confusion of attitudes, motivations, rational and irrational arguments based on a wide disparity of information, misinformation, and lack of information.'

The report – to my mind correctly – states that reliance on the formal educational system will help to develop responsive attitudes; but that the most immediate need is to put the facts of international interdependence squarely to adults, and involve them in two-way communications about the future. Obviously, the media will have to play a key role. It is recognised that their contribution to these aims is less effective than it might be.

This example has been mentioned in the conviction that the same basic situation prevails not only on this issue but on many others and not only in the UK but in most other countries. The complexity and interdependence of the issues facing national societies and the international community are now such that no governing will be possible without a much greater public understanding. Modern societies have proven much more vulnerable than perceived; they will not be able to function or develop in desired directions without public understanding of the issues involved.

This, then, is the kind of approach which I personally feel must be taken as the basis for a media policy that will serve both society and citizens.

This article is based on a paper written by Edward Ploman, Executive Director, IIC, on commission for the Norwegian government committee on the mass media. The commission has kindly agreed to the use of some of the material in *InterMedia*.

Broadcasting and the European elections

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The recent elections to the European parliament were a historic but enigmatic event. For the first time, European citizens were invited to shed their national skins by electing the members of a supra-national body. But exactly what kind of an assembly was it? How influential a force on the European scene might it eventually become? And on the basis of what sources of information, and on what grounds of choice, would electors decide to accept or decline the invitation to vote?

It was hoped by some supporters of the European cause that the elections would help to democratise the European Community, legitimise its governing institutions, diffuse European consciousness more widely, and nourish into more vigorous growth the seeds of a European-level body of public opinion. But could such goals be effectively advanced, when the European Community itself was such a curious and incomplete political entity – lacking a government and containing an assembly with only limited formal powers – and when the elections would be fought largely by national parties addressing voters through national media systems?

Much would depend on how the campaign was conducted, as Michael Steed pointed out as long ago as 1971: 'Insofar as the campaign was conducted at the European level and insofar as electors saw the election as a European one, it is arguable that nothing else would do so much to create a sense of involvement in the European Community.'[1] Much would also depend on how television – that still pre-eminent medium upon which voters rely more heavily than on any other for their political information and impressions – would present the elections. As Michael Steed also declared, it would largely be 'in the hands of the television and radio to determine whether the campaign acquires a European coherence.'

That is why the International Institute of Communications has initiated a major study of the role of broadcasting in the European elections. It is being conducted along parallel lines by collaborating teams of leading political scientists and media scholars in all the nine member countries of the European Community. The inquiry has been designed with both policy and academic issues in mind. Two examples of the former may be mentioned here. The investigators are examining the balance that was struck, in broadcasters' and parties' approaches to the television campaign, between the European and domestic dimensions of the event, and they are striving to pin-point those influences which have served to encourage a more national or more international treatment.

Rewarding to voters

They are also considering how far, and in what respects, communications about the European elections were rewarding or off-putting to voters and viewers – again seeking out the factors that helped to shape audience responses to the campaign in such terms. A key to the academic side of the research is the fact that the European elections comprised a single political event that was presented to electorates through nine different broadcasting systems. It affords a unique opportunity systematically to advance the comparative analysis of political communication processes. In what respects were the broadcasters' European election policies and programming provision alike and dissimilar across the nine systems? And what underlying factors – possibly of political culture, election broadcasting traditions, or relations of broadcasting organisations to the State – would help to explain these patterns?

In each country the investigation is being pursued at three main levels. The first concerns the role of the *campaign communicators* themselves – the broadcasters and party publicists. How, in advance, did they face up to the challenges and difficulties posed by this unprecedented election, and how, afterwards, did they assess the lessons of their experiences? At this level, semi-structured interviews, using common questionnaires, have been held with news and current affairs broadcasters and party representatives. In the case of the broadcasters, for example, we have aimed to find out: what policy issues arose for consideration and how they were dealt with; what special responsibilities, if any, were assumed (say, to promote viewer interest, knowledge, or awareness of Europe); and what problems of coverage were anticipated in comparison with those that arise at a typical (national) general election. In the case of party politicians, we wanted to understand their election publicity strategies, what part European themes and alliances would play in them, what expectations of broadcasting would flow from them – and how these compared with equivalent approaches to a general election.

At a second level, we are examining the actual *programmes* that were transmitted during the European campaign. A detailed scheme of content analysis has been prepared, which will enable us to compare each country's television coverage on a number of crucial matters. The approach can be illustrated by listing some of the questions that the resulting evidence should help us to answer: How did the various broadcasting systems differ in the overall amount of attention they paid to the European elections? What proportions of the coverage were provided through party broadcasts, news reports, regular current affairs programmes, and specially scheduled debates and documentaries? How far were the election issues highlighted in programmes the same or different from country to country? In other words, in issue terms did Europe experience one election or nine?

In the discussion of key issues, to what extent was a country's membership of the Common Market presented as advantageous or disadvantageous? What visions of the future of Europe were disseminated? How were the problematic powers of the European parliament – in the here and now, and for the future – explained and debated? How far were the direct elections presented by broadcasters to their audiences as a European as distinct from a purely domestic event – as measured, for example, by the treatment of campaign issues, the number of reports broadcast from *other* countries' campaigns, and references to cross-national party blocks? How much and what kind of attention was given in the various countries' election results programmes to European-wide voting patterns as distinct from reporting purely national results?

The response of the *electoral audience* to the European campaign forms the third main focus of our enquiry. A prime instrument of analysis here is a 14-question survey of national samples of voters that was fielded in all the nine countries except Luxembourg shortly after election day. This will show,

comparatively, what the different electorates thought the main election issues were; what they knew about the voting results in European terms; how they followed the campaign on TV and through a number of other communication channels; what they thought the good and bad points of the TV coverage were; whether they voted, and if not why not; and how they felt about the future development of Europe. In addition, in some countries, through extra before-and-after surveys, the effects of the European election campaign on the outlook of voters will be measured, considering especially any changes that may have occurred in their knowledge levels, European awareness, issue impressions and voting intentions.

Results so far

What points of interest seem to be surfacing from this work so far? Of course, no definitive results are yet available, since at the time of writing the data that have been collected are still locked in questionnaires, coding sheets and computer files. Nevertheless, some emerging impressions can be provisionally gathered around four main likely hubs of the eventual analysis.

First, for *broadcasters*, the coming of the European elections gave surprisingly vigorous meaning to a seemingly old-fashioned policy dilemma, which can hardly even be formulated without resort to a cliché. Should broadcasters give a lead to public opinion? Or should they trim their coverage sails to the prevailing opinion winds that happen to be blowing at the time?

In Britain at least that dilemma seemed to have more horns than a herd of elk. Literally every broadcaster with an opinion whom we interviewed agreed that the audience's interest in the European elections would be less than for a general election. On the other hand, they also realised that viewers had European ballots to cast and would need to be given a lot of background information in order to place their voting opinions into even elementary perspective. Yet at some point, insistent programming could be interpreted as 'bending news standards' or 'flying a banner for Europe', a form of implicit editorialising that should be shunned – especially in a country where the value of Common Market membership was still being seriously questioned in some political quarters. And, anyway, who was to say that the indifferent elector 'ought' to be coaxed out of his home and garden into the polling booth?

Some of the fibrillation set off in the hearts of British broadcasters is neatly reflected in this comment, when interviewed, by a regional TV news editor:

I'm in a difficulty because my roles as a broadcaster and a journalist point me in different directions. As a journalist, my instinct is not to be interested at all, because the European elections lack the inherent drama of the UK general election. You don't get the same polarisation: Will it be Jim or Maggie? Although it may grow, the influence and power of the European Community to change people's lives is also not great. As a broadcaster, one says, though, that this is one of the early steps towards what ultimately could be a profound road. And I've some duty at least to explain the process being started. So I have to force myself to be more interested than I naturally am.

In the end, the British system compromised. The programmers discovered a way to sprawl across the hollows of the antlers without suffering impalement at any point. The solution included: very few party

TABLE I

European and recent general election turnout results

	European election %	Last general election %
United Kingdom	32.4	76.0
Denmark	47.0	88.9
Netherlands	57.8	87.5
France	61.3	81.1
Ireland	63.6	76.9
Germany	65.9	90.7
Luxembourg*	85.0	85.0
Italy +	85.5	89.9
Belgium +	91.4	94.6

*European and general election polls were simultaneous.
+ Obligatory voting.

TABLE II

Some French and British electoral reactions to the European campaigns

How interested voters were in the campaign

	Britain %	*France* %
Very	10	9
Quite	20	30
Only a little	27	33
Not at all	42	27
Don't know	1	1
	100	100

Reactions to the amount of election coverage on TV

	Britain %	*France* %
Far too much	11	29
Bit too much	9	20
Right amount	30	38
Not enough	43	5
Don't know	7	8
	100	100

broadcasts; regular but low-key news coverage; an average of about one European election edition for each of the many regularly scheduled weekly current affairs programmes; the addition to the schedules of a few individually constructed special discussion and documentary programme efforts on a more grand scale; and, most impressively, many streams of carefully pre-planned educative items, intended to meet audiences' needs for information. These last appeared at periodic intervals in the *Nine O'Clock News*, *News at Ten*, the sequences of Radio 4 (and especially the *Today* programme), a special five-part ILR series, and in much of the regional TV coverage.

It is premature to say anything about the impact of this information campaign on what British voters finally knew about Europe. One highly interesting influence on what the broadcasters decided to do, however, does deserve a mention, because of its possible relevance for the future. Unlike a general election, the European election forced the broadcasters to ask themselves whether it was an event that deserved special attention and if so of what kind. They found themselves musing and sometimes debating: whether there was a long-term historical tide drawing Britain ever more closely into Europe; whether the European parliament could ever become a politically significant body or would always remain little more than a talking shop; and whether broadcasters should worry if turnout was low or should assume that apathy and abstention were perfectly proper and rational responses to European election choices. There is also some evidence to suggest that opinion on these matters affected some policy judgements and programming decisions. If so, this implies that the track record of the newly elected parliament between 1979 and 1984, insofar as it either resolves or depends the sceptics' doubts, could well help to determine what kind of coverage broadcasters will feel inclined to give to the *second* European election campaign.

Setting the agenda

Secondly, there were very big cross-national variations in the inputs of the *political parties* into the television campaigns. These could be highly important for two reasons. For one thing, election agenda-setting these days is probably far more a function of what the political parties decide to emphasise than of what the broadcasters select for presentation. Journalists have increasingly accepted in recent years that the prime election task of the news bulletins, at least, is 'to hold the ring between the contesting parties'.[2] For another, electoral motivation to vote may crucially hinge on the quality of the parties' campaign efforts. After all, the British broadcasters' emphasis on educative background provision during the European campaign could in the end have given people only a certain amount of information – and not a will to *act*. Only the political parties can offer the public, not just an ordering of issue priorities and some policy alternatives to choose between, but also a presentation of such options in ways that make the choice seem to *matter*.

So what were the main differences in the parties' contributions to the broadcast campaigns? Several can be mentioned. In some countries (Italy is a striking example; France, the Netherlands and Denmark may also be cases in point), there was more party broadcasting than broadcaster-originated programming in the schedules. In Britain, the reverse applied. In some countries, the level of party activity was much higher than in other. Germany fell at the most strenuous end of this scale, perhaps, and Britain at the lethargic extreme – so much so indeed that a BBC newsman complained afterwards that 'Reporting the European election campaign was like wading through mud.' Then, while some parties wheeled in their big guns (France?), others kept them under wraps (Britain?).

The crux of party debate was also variable. Was it geared to national policies and records or to European platforms? Ireland was seemingly an example of the former approach, while Britain was forced to adopt the latter, having already closed its books on the domestic struggle on May 3rd. And insofar as European questions were introduced into the elections at all, they were inserted in different ways. In Denmark, with the entry of the People's Movement against the Common Market, the election was like a re-run of the 1972 referendum. In Germany, the parties vied to demonstrate their superior commitment to Europe. In Britain, much of the contest seemed to turn on which party could win a better deal for the country's interests in the European Community.

The effects of these differences on the viewers have yet to be determined. But out of these mixed patterns, two more general impressions seem to be emerging at this stage. One is that the political parties did not always find it easy to bring the campaign to life when fighting on European ground. Differences of priority, policy and philosophy did not seem to crystallise so naturally as at a general election. The other impression is that in the main a more animated effort was mounted in those countries where the European election provided a convenient mid-term test of the parties' national popularity – as in France and Ireland, for example. If so, this may be traceable to the lack of any clear-cut power prizes and penalties for victors and vanquished at the end of the European election day.

A law unto itself

Thirdly, the involvement of *viewers* in the European election campaign was everywhere problematic – though the British electorate eventually turned out to be a law unto itself in this respect. One measure of the problem appears in Table 1, which lists for each nation the European election turnout figures alongside those that were registered at the most recent general election. It can be seen that in many of the countries the European voting rates fell well short of general election standards. If 70% is accepted as a reasonable target (specified last year by Herman and Lodge because it broadly fell between average general election and local election turnouts in the Community as a whole),[3] then the only countries to reach it this time were those where voting was compulsory or where the European poll coincided with a national one.

We are not yet in a position empirically to identify the main aids and obstacles to voter involvement; but it may be useful speculatively to mention two main reasons why it presented a problem that was not so readily overcome. One of these reflects the attitudes of voters to all things political these days; the other arises because the European Community is not a natural electoral forum.

The more general point to bear in mind is that, in many democracies, the signs have been multiplying in recent years that voters are becoming ever more critical and ever less tolerant of the supposed shortcomings of election rhetoric. They seem very quick indeed to find fault with political argument for being tedious, repetitive and boring, devious, unintelligible and unconstructive, and for failing to make the issues plain. Thus *any* election nowadays stands as good a chance of being experienced by voters as an imposition, as it does of being received as a welcome opportunity to shape their destinies and to build a more hopeful future.

Regarded in this light, there was much scope for viewer frustration in the first direct elections to the European parliament. The reason was not necessarily just because no goverment would hang on the result – or even because the European parliament lacks legislative power. The latter is a highly abstract consideration, which might not have even percolated through to many voters, who are accustomed to follow

campaigns with more down-to-earth concerns in mind. But, in retrospect, the difficulties of giving the European campaign a sharp focus did seem quite formidable. What *was* the election to be about? The future of Europe? The type of force the new parliament should become? Promoting the country's welfare more vigorously in the community? The purely domestic merits of the contenders? One can sense from such a scatter of possible talking points why, in comparison with a typical general election, it might have been *inherently* more difficult to stage a European campaign of which the voters could make much sense.

Voters and politicians

Certainly on the very limited survey evidence that is so far available – from France and Britain – the viewers did seem rather difficult to satisfy. A glance at Table II will show, for example, that in both electorates the level of European election interest was low. Interviewed afterwards, majorities said they had been at best 'only a little' interested in following the campaigns. Yet the same samples also produced quite divergent distributions of response to another question about the amount of election coverage that was provided on TV. The evidence almost suggests the presence of what might be termed a 'perverse audience' confronting broadcasters and politicians at Euroelection time. Provide a relatively active and sustained campaign, as the parties seemed to do in France, and audience members will tend to say that they have heard the arguments over and over again; the election was boring; and there was too much of it on TV. But provide a low-key campaign, as in Britain, and audience members will say they felt confused; could not understand what the election was about; failed to vote because they were insufficiently informed; and that there was not enough on TV. No wonder a Dutch newspaper was said to have headlined the election results with a banner proclaiming that 'Voters Disappoint Politicians'!

Finally, the European elections brought into fascinating confrontation with each other two opposed perspectives on *the role of communication in promoting European integration*. One of these tended to cast broadcasting in the part of a *vanguard*, helping to lead citizens towards a more European outlook as their own point of departure. The other treated broadcasting more as a reflective medium, mainly a *mirror* of the nine separate campaigns waged in each country, of the differing electoral interest levels prevailing in those countries and of their sometimes highly diverse political broadcasting traditions as well.

The forces that could actually affect the outcome in these terms, however, did not divide up quite so neatly into these two camps. They included representatives of the information directorates of the European commission and the European parliament, and of the European Broadcasting Union, who were taking advantage of the elections to achieve their own aims. And there were numerous individual broadcasters – executives, editors and producers – who owed a primary obligation to their own organisations and viewers but who, in varying strengths, also felt a need for help in relaying 'the European story' as interestingly as possible. Some of the latter became increasingly involved in the European scene in response to a variety of motives – editorial judgements, the novelty of new subjects and production ventures, fascination with large-scale technology and circuitry, etc. Others held back in response to varying moods of scepticism, economy-mindedness, and perceptions of standard viewers as essentially insular.

On the night

This is not the place to relate in detail what was achieved. It does appear that Europe moved higher up the agenda of many TV journalists' lists of priority world concerns than before the elections. Their own contacts with each other across national and broadcasting-system boundaries multiplied greatly. As one producer explained, 'It is as if a broadcaster "Eurogroup" has come informally into existence.' A former virtual media boycott of the European parliament was well and truly broken. On the night of Sunday, June 10th, against what at one stage seemed very daunting odds, election results programmes did go on the air in almost all the community countries more or less simultaneously. The producers received considerable assistance from the EBU in getting reports back from their local correspondents. If they wished, producers could also choose to screen any of about 50 'multilaterals', which were sent round Europe as the pick of each network (eg, film reports, interviews, scenes at counts and party headquarters, politicians' reactions to the results, etc.), and which were backed up by a remarkable service of simultaneous interpretation in six languages.

Decided limitations to this effort were also much in evidence. Sustained broadcaster cooperation mainly applied to elections results presentation. On the whole, both the broadcasters and the politicians who were invited to come into the studios to comment showed more interest in the national results than in the European ones. And more often than not the European picture was relayed through a miscellany of 'short stories' (what happened to the rival parties first in Germany, then in France, then in Italy, etc.) than as a single coherent tale of its own. It lacked a central focus and a clear set of leading personalities. Its main unifying elements – the Euroblock party groupings – were confusing and unfamiliarly tagged. And it was difficult for producers to devise ways of relating the overall pattern of results to their own viewers' circumstances and political experience.

Only the findings of our project's content analyses and audience surveys will enable us properly to gauge the contribution of all this to the development of a European identity. At this stage, however, it looks as if (largely under broadcasting's auspices) many potentially integrating networks of communication were thrown across the countries of Europe. But the flow of potentially integrating symbolic material through them was relatively thin.

Professor Blumler is Central Director, and Director of the UK Study, of the IIC Project on the Role of Broadcasting in the First Direct Elections to the European Parliament.

Notes

1 Michael Steed, 'The European Parliament: The Significance of Direct Election', *Government and Opposition*,, Vol. VI, 1971, pp. 462-476.

2 ITN executive cited in *The Challenge of Election Broadcasting*, by Jay G. Blumler, Michael Gurevitch and Julian Ives, Leeds University Press, Leeds, 1978.

3 Valentine Herman and Juliet Lodge, *The European Parliament and the European Community*, Macmillan, London, 1978.

NORDSAT: *A libertarian dream*

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The oldest and most often discussed plan for a regional satellite for TV broadcasting is the Nordic countries' Nordsat. It has been discussed vigorously in the five Nordic countries for at least three years, both in Nordic organisations and in national governments and broadcasting companies. The five countries are Denmark, Finland, Iceland, Sweden and Norway.

It was felt, in some general way, and backed by varying degrees of technological expertise, that these countries could only support a satellite for direct broadcasting if they collaborated in a joint venture. Singly, the countries are small. Together, they make up 1,600,000 square kilometres (three times as large as France, six times as large as the UK) and have a population of 22 million.

A key report on Nordsat was submitted by a working group of the Nordic Secretaries of State in 1977. It elaborated the idea of Nordsat on the basis of three overall objectives. The first was to strengthen Nordic cultural cooperation. The second was to increase the choice of programmes available to Nordic audiences by enabling them to receive programmes from other Nordic countries. Third, it was intended to allow immigrants within the Nordic community to watch TV programmes from their home country.

These objectives, it was suggested, could be achieved in two ways. The Nordsat system could transmit all Nordic programmes to all Nordic countries. This blanket approach would mean a manifold supply of TV in comparison to the present situation. Sweden and Finland now have two national TV channels, while Denmark, Norway and Iceland have only one.

The alternative would be a system that selected the best and most interesting TV programmes of each Nordic country and broadcast them, on a special Nordsat channel, to the other Nordic countries.

My assessment here of these objectives and expectations is based on a study made for the Secretariat for Nordic Cultural Cooperation by Mr. Helge Østbye (University of Bergen, Norway) and myself. The study is a part of a set of Nordsat reports that deal with technical, legal and economic aspects of the planned satellite as well as with programming policy. The reports were published last autumn.

No agreement on definitions

According to superficial common sense it appears self-evident that Nordsat must decisively strengthen not only Nordic cooperation in cultural affairs but also the cultural integration between the Nordic peoples in general. However, a deeper investigation of these issues shows that the situation is more problematic.

The exact substance of the concepts of 'Nordic integration', 'Nordic cultural integration', etc., is open to question. No one has produced a scientific definition. Nordic cooperation in cultural affairs involves quite large sums of money every year; but the basic concepts behind this cooperation are practically devoid of study, analysis and definition.

We also can wonder – but not prove – if Nordic cultural cooperation has not already passed its peak. The increasing range of contacts between the Nordic countries and the rest of the world has begun to replace contacts among Nordic countries – even if the latter have become more lively. One of the results of an attitude research study initiated by the Nordic Council and published back in 1973 may be symptomatic. The youngest generation was relatively the least interested in neighbouring Nordic countries and the most interested in the wider world. Might Nordsat therefore be too late? Have the Nordic countries already become anglo-americanised. Is a return to 'Nordism' possible any more?

Even if the above were not true, it might be argued, would not Nordsat be the most efficient way of maintaining Nordic cultural integration as strongly as possible? Apparently not.

The joint Nordic channel would be an elitist solution. With some certainty we can say that it would appeal only to the small group of people who are especially interested in neighbouring Nordic countries. We can compare this minority with the equally small numbers of people who subscribe to daily newspapers from other Nordic countries. The joint Nordic channel would play a small role for the large majority of the Nordic people.

The other alternative, of transmitting all Nordic programmes to all Nordic countries simultaneously, would be entirely different. It has the twin advantages that it would serve the various audiences without delay and that it would contain imported non-Nordic programmes. But there are disadvantages. The pull of the programmes of neighbouring countries, in comparison with domestic programmes, would normally not be sufficient to get many viewers.

We must try, without any prejudices, to find a solution of a different kind. There is a solution – even if it means cutting the Gordian knot. The most efficient way to promote Nordic cultural integration by means of TV is to develop the exchange of programmes in the frame of the existing Nordivision system – for which no satellite is needed.

Free choice

In the debate about Nordsat the second of the two objectives listed above ('to increase the choice of programmes') has played a very important role. Often, the key concepts have been reduced to three: freedom of speech, free choice and pluralism.

The original doctrine of the freedom of speech was inextricably involved with the old libertarian theory of the press. This theory was most interested in serious information and opinions about serious questions in society. It sought the ultimate objective of reaching truth about reality.

It is not at all certain that Nordsat would increase this kind of freedom of speech in the Nordic countries. Freedom of speech depends on several complicated factors that cannot be forecast exactly. When the audience is multiplied, Nordsat might, in certain conditions, make journalists even more interested than hitherto in good ratings and good reviews, and so decrease their willingness to treat the serious questions of society openly and deeply. In other words, there is a risk of commercialisation.

Another of the many factors relevant in this connection is the overall economy of the mass media. If a very large share of the resources available for communication and cultural supply in the Nordic countries were spent on a satellite would that diminish the resources available for maintaining freedom of speech in other media?

The concept of free choice can be dissected in a similar manner. The idea of free choice in a genuine

sense is choice between things that are different; in this case, between different mass media messages. To have choice between, let's say, several channels with more or less similar contents can be interpreted as free choice only in superficial thinking or demagoguery. Nordsat naturally can increase free choice in relation to the timing of programmes, in the sense that simultaneous alternatives available to Nordic TV viewers cannot be identical.

But it is doubtful if free choice in a deeper sense would be increased by the satellite. To maximize free choice should mean to maximize the differences between the mass media messages that are available. In practice, greater free choice could be achieved by importing programmes from countries that are very different from Nordic countries (for instance, some countries in the Western world, socialist countries, developing countries).

Pluralism belongs to the same family of concepts as freedom of speech and free choice, but its history is more recent. It is one of the ideas of so-called bourgeois liberalism and it interprets all the social ideologies, opinions, etc, as being fundamentally of the same value. Much of what can be said about the relation of freedom of speech and free choice to Nordsat can also be applied to the relation of pluralism to the satellite: to maximise the differences between repertoires.

The relative similarity of the Nordic countries, and of their broadcasting policies, makes it very questionable whether the values listed above would be increased by Nordsat at all. Would not the same economic resources, if used in other ways, increase, these values (freedom of speech, free choice, pluralism) to even larger extents?

Important for immigrants

How realistic is the third objective of Nordsat? It is partly a technical question, and the answer is self-evident. The satellite would allow immigrants within the Nordic community to watch TV programmes from their home country. But it should be noted that the largest group of Nordic immigrants is composed of Finns working in Sweden and, because they live relatively concentrated in certain regions, it is possible to make Finnish programmes available to this group with some conventional Earth stations.

There is no need to go to the expense and bother of a broadcast satellite. But the problem of the third objective is not only a question of how realistic it is. The real question is whether the aim of allowing immigrants to watch TV programmes from their home country is really, in terms of TV, the most important thing which can be done for them.

If full employment or a shortage of labour existed in Finland, and the Finns in Sweden were only waiting for matters to improve before they return home, we could say that to watch Finnish TV programmes is something that is worth promoting by all means. But the situation is very different. Many of the Finns in Sweden must be understood to have changed their home country once and for all. More important for them in the mass media is information in their native language about the circumstances of their new home. They should be helped to orientate to their new home and country and to take care of their legitimate interests there; rather than hark back to the country they have left.

There is no doubt that Finns in Sweden would eagerly watch Finnish TV programmes, if it were possible. But a survey among the immigrants shows that the Finns in Sweden realistically understand the importance of information about their new home country.

Confrontation and mistakes

The debate about Nordsat has been vivid. It has become a confrontation, with extremist points of views. Nordsat has been opposed both on the matter-of-fact level and with exaggerated claims verging on propaganda. Some people have been afraid that Nordsat would tremendously increase TV watching and diminish other cultural interests. The existing, indirect evidence suggests that such a switch is most unlikely.

The satellite's role would vary in the different Nordic countries. It would be more significant in Norway, Denmark and Iceland, which have only one national TV channel and a certain need for more programmes, and less so in Sweden and Finland which have two national channels. It would probably be least significant in Finland, which has much looser cultural ties to the Nordic community, and a language of very different type from the other Nordic languages – and subtitles are hardly capable of eliminating the psychological language barrier.

It is reasonable to be worried about the very strong position of Anglo-American mass culture in the Nordic countries. But Nordsat would hardly, in any essential way, further this colonialisation of Nordic tastes. The risks of the 'entertainment slalom' – of selecting the most trivial of simultaneous programmes – is not an especially serious danger to cultural policy. The average viewer is not normally very selective, towards entertainment or anything else.

In discussion, the most eager supporters of Nordsat have simply declared as their starting point the merits of the objectives of Nordsat, as if they were unquestioned. They have not been very interested in criticism or studies about how realistic these good objectives might be.

My own attitude, in a nutshell, is that the Nordic TV satellite is a libertarian dream. It is not just liberal, it is libertarian. Its supporters – many of them sincerely – are dreaming of a Nordic community which, by means of modern communication technology, could be changed to a unity, an island of liberal ideas in a hard world.

The facts make this libertarian dream less than realistic. The Nordic TV schedules hardly correspond to the idea of free choice. The differences between them are not large enough, and watching them does not illuminate serious problems from totally new visual angles. Secondly, the behaviour of Nordic viewers is surely not in harmony with the ideas of liberalism in the sense that the viewers would, with maximum rationality, choose their favourite programmes from seven simultaneous alternatives.

But even if Nordsat is an unrealistic dream, the technology of satellites, as such, is useful. It opens up many kinds of possibilities for us. The next task is to learn to use these possibilities in the most reasonable way. A common, direct broadcast satellite for the Nordic countries in the eighties does not belong among these most reasonable solutions.

PLANNING: *Looking forward to creativity*

Jan Henrik Nyheim, Norsk Rikskringkasting

Large bureaucracies are spending an increasing amount of time in generating, formulating and monitoring a picture of the future in which they will have to operate. Yet their plans, forecasts and strategies often suffer from two chronic weaknesses. First, they are usually based on the past, on what has happened, to an unacceptable extent. Of course, our knowledge of the future is incomplete, and scanty, as well as being uncertain. But even the knowledge and probabilities that do exist are often ignored.

Second, orthodox planning is extensively based on economic and technical factors. The social, cultural and even psychological matters are omitted. Also, the quantitative tends to be favoured over the qualitative.

So the activity that formalises our concern with the future is normally based on yesterday's methods, yesterday's knowledge, yesterday's solutions. When the basis of the plans is more sensible, and when the plans do produce something useful and worthwhile (and they sometimes do, in spite of everything) the benefits are often diminished by yet another common constraint. Most bureaucracies take a long time to decide what to do, and, again, to do it.

An alternative method

I will not, in this article, discuss the extremely important and interesting subject of why bureaucracies behave in this manner. Instead, I want to describe an alternative method that has been used by the Norwegian Telecommunications Administration (NTA). It's called Telsam, which is an acronym based on the Norwegian words 'teletjenester og samfunnutrikling' (telecommunications and social development).

The Telsam study is not unique. Among the Nordic countries, Sweden has done similar work. Australia's Telecom 2000 team has done pioneer work with its sponsorship of open planning. Indeed, one can see many signs of similar movements in many countries.

Telsam began as an informal gathering of people with different educational backgrounds and occupations. Everyone had only a vague idea of what he was really supposed to do. But within a few months there emerged an enthusiastic and well integrated group of people with a clear sense of what they had a chance to do, and eager to move forward. After the initial uneasiness and bewilderment, motivation was never a problem.

The Telsam study was an offspring of a major long range planning effort within the NTA – the first of its kind in Norway. The plan was designed to outline the possible and/or likely application of every established or new telecommunication techology and service in the eighties and early nineties. The impressive final document (or documents) will be completed before 1980 and will eventually be discussed and adopted (with or without amendments) by the National Assembly in 1981 or 1982.

It originated in this fashion. After several efforts in the direction of future studies (scenarios, Delphi studies) in limited areas, and when the long range study was well under way, a letter went out from the NTA Research Establishment (Televerkets Forskningsinstitutt) on April 12, 1977, to a number of institutions, university institutes, and other organisations, and to individuals. The recipients were invited to form a group and try to throw some light on three key subjects.

They were asked to map telecommunications' various effects on society, today and in the future. They had also to discover how telecommunications can be designed to comply with overall political guidelines and goals. The third issue was telecommunications as a possible instrument in the process of building and transforming society. Telecommunications as a means, not as an end.

Three sub-groups were set up to work in parallel on these issues. Members could and did move freely between the different groups.

The Telsam group started work in May 1977 and will probably finish phase one this winter. The NTA Research Establishment acted as the group's coordination centre and secretariat, and had three employees, including the Telsam project leader, in the group. The project's direct expenses during 1977 and 1978, including fees, printing and some overheads, total about 230,000 kroner (£23,000).

Deserves attention

I will mention briefly the four reports that Telsam has produced so far, and outline three more which are being prepared, before suggesting what makes Telsam tick. And what makes it worth some attention, both inside and outside telecommunications administrations.

In English, the title of the first report, which appeared during summer 1978, would be something like *Telecommunications, social development and society-oriented planning*. It tries head-on to outline the many different relations between telecommunications and the various aspects of society that are affected by the growth of telecommunications. It also tries to indicate how the growth of telecommunications is affected by the society (social conditions) of which telecommunications is one part. A two-way relationship, to put it very simply. The second report, which appeared at the same time, is *Telecommunications and society: A review of literature and research*. It provides a bibliography for the first report.

It gives a readable and well-organised summary of the main theories and major research. Its emphasis, of course, is on post-war mass media and communications research. Personally I think it is an excellent handling of a very complex and difficult subject.

The third describes a computer-based study of the relationship between the use of cars and the use of telecommunications: with the accent, of course, on the question of substitution. The study is very model- and method-oriented. Its title: *Telecommunications and the use of private cars: An analysis based on a (mathematical, computer-based) model*. The fourth report appeared during the late summer of 1978 and is called: *Telecommunications, patterns of settlement and local communities*. It returns to the main theme of the interplay and interdependence of telecommunications patterns and government policy in other areas of society. The report discusses several possible uses of telecommunications as an instrument of social intervention.

Three more reports are being prepared and will probably appear during 1979 or early 1980. Number 5 will discuss the possible and likely uses of videotex in Norway. Number 6 will contain three contributions. One will discuss law and copyright with relevance to new telecommunictions developments; one will go into the possible use by mass media of telecommunications; and one will look into the possible uses and effects of new two-way media in public debate and political

decision-making. Number 7 will contain comments on the Telsam project, and reports from some 10 people who are involved in media developments.

Four advantages

How does this activity contrast to the traditional kinds of planning, with its weaknesses of backward-vision and technical bias, which I described at the beginning? It has four marked advantages. The Telsam initiative brought 'the outside world' into the planning of future telecommunications services. The study group included sociologists, political scientists, experts on media and marketing, people engaged in broadcasting planning and future studies, city and area planners, economists, engineers, communications and mass media scientists. Almost automatically, this mixture had two effects, both beneficial. It meant that the group's perspective would be from the outside, looking in, rather than a copy of the NTA's traditional, conventional perspective from the inside (the institution) looking out. The other effect was to imbue the proceedings with a rich variety of viewpoints. The discussions were truly multi-dimensional.

No defined outcome was asked for. When Telsam set sail, no one knew which seas it would cross or where it would reach land. The group was entirely free to choose its own style of work and tempo. To attack the future in this manner is usually regarded as being too risky, or a luxury we cannot afford. But I think this deliberate exploration of the uncertain gave the project a freedom which released an important element of innovation, of creativity.

The element of policy (or of policy-thinking) soon became dominant. The interplay between government actions and attitudes and the past, present and future application of technology became an important reference point in Telsam's efforts of mapping unknown territory.

A two-sided myth

What this claim really amounts to is the conviction that the planning of future telecommunications services ought to take place in parallel with the formulation of policies. The normal viewpoint is that planning is one thing, and that political decisions based on the outcome of the planners work is something else. The myth is two-sided. It suggests that planning comes first, and is mainly technical and economical. Then it's the turn of the politicians and lawmakers. We dispelled that myth.

These three conditions – in the chemistry of the mind – produced a fourth element which I think one may call 'creativity'. My dictionary says that to create is to 'cause something to exist; make something news, original or different'. Also 'cause; bring about; produce'.

The endless questioning during Telsam meetings and discussions, the uncertainty, the wondering and all the new angles, produced many new ways of looking at telecommunications, its workings and its uses.

One special lesson from the Telsam study is perhaps that planning ought not to be an isolated one-dimensional, ad-hoc activity, aimed at producing impressive documents which may or may not be acted upon. Planning must be a multidimensional, continuous activity, integrated in the life of the organisation and in contact with the society which it is to serve.

Another important point is that the insight gained in one country or government through such initiatives can only to a small extent be exported to other countries. One may learn from others how such things ought to be introduced, about methods and, in a general way, what the gains are likely to be. But nothing can replace one's own efforts and experiences. There is no substitute for doing it oneself; partly because the job has to do with attitudes and the climate of planning, partly because the situations and problems are never the same from one country to another.

The combined and long range effects of these points and the Telsam project may be to influence, in a positive way, the methods and style of planning – and not only in the area of telecommunication. It may help politicians, technicians, economists and lawmakers to get an idea not only of the complex patterns which create modern society, but a knowledge of how to achieve something in one area (say, social services, health care) through actions in quite another area (telecommunications).

It may, in short, perhaps make planning better, and at the same time make planning better understood and more easily accepted by everyone involved in planning or affected by it. And aren't we all?

American Mass Media
edited by Robert Atwan, Barry Orton and William Vesterman.
Random House, 201 East 50th Street, New York, NY 10022, USA; 475pp; 1978; ISBN 0 394 32029 8; $8.95.
An introductory reader, with 60 extracts of general analyses, articles, opinions on US publishing, advertising, broadcasting, film, etc.

The American Vein
by Christopher Wicking and Tise Vahimag.
Talisman Books, 18 Charing Cross Road, London WC2, UK; 262pp; 1979; ISBN 0905983 09 2; £7.50.
Brief biographies of US television directors, and even briefer notes on the main US television series.

The Arab States Broadcasting Union in Ten Years
ASBU, 22a Taha Hussein Street, Zamalek, Cairo, Egypt; approx. 60pp; free.
A review of ASBU activities since it was formed in 1969.

Arts and the EEC
Institute of Contemporary Arts (ICA), Nash House, 12 Carlton House Terrace, London SW1; 147pp; 1979; ISBN 0 905263 02 2; £10.00.
Report of an ICA conference held on 11-13 May. Includes some good analyses of cultural policies in general, and in the EEC context.

Behind the Screen
by Carel Enkelaar
NOS, Hilversum, in association with Stregnolt b.v., Hofstede Oud Bussem, Naarden, Netherlands; 108pp; 1979; ISBN 90 6010 900 7; $10.50.
An interesting collection of stories describing how – often in nerve-racking circumstances – certain events became televised or included in a news report. The book was written to commemorate 25 years of Eurovision.

Cable Television
Canadian Radio-television and Telecommunication Commission, 100 Metcalfe Street, Ottawa, Canada; 66pp; 1979; free.
The report of a second survey on community programming and cable TV conducted by the CRTC six years after its first survey in an attempt to analyse whether provisions made earlier for the introduction of cable TV have remained sufficient.

Compendio de Cursos y Egresados
Centro de Venezuela del Projecto Multinacional de Technologia Educativa, Apartado 1147, Caracas 101, Venezuela; 96pp; 1979; free.
A directory of institutions in over 20 Latin American countries and their courses in educational technology.

Computer Peripherals in the 1980's
International Resource Development Inc, 125 Elm Street, PO Box 1131, New Canaan, Connecticut 06840, USA; 278pp; 1979; $1,265.
International Resource Development are an established independent consulting firm which have been studying the computer and telecommunications market for the last eight years. Their report on the future of the computer peripherals market and industry contains twelve main sections including peripheral trends, the influence of computer industry trends on peripheral markets, a ten-year framework for peripherals (maxi, mini and micro) and ten year forecasts for data entries, terminal markets, magnetic tape and disc markets and communications peripheral markets.

Copyright in Computer-Readable Works: Policy Impacts of Technological Change
by Roy G. Saltman.
S/N 003-003-918- 43-1, Superintendent of Documents, US Government Printing Office, Washington DC, 20402, USA; 267pp; 1977; price on application.
The findings, recommendations and conclusions of a five-year study of copyright in computer readable works.

Entertainment: A Cross-Cultural Examination
edited by Heinz-Dietrich Fisher and Stefan R. Melnik
Hastings House, 10 East 40th Street, New York, NY 10016, USA; 330pp; 1979; hardback ISBN 0 8038 1945 5, $18.50, paperback ISBN 0 0838 1946 3, $9.50.
Interesting collection of 26 wide-ranging articles on 'entertainment as communication'. The theme is the importance and content of the messages, often hidden, contained in entertainment media and offerings.

Experiments with local cable television and local regional radio in the Netherlands
by Armand Sliepen
DECS/DC(79)11, Council of Europe, Strasbourg, France; 29pp; 1979; free.
A report on the small-scale experiments on cable TV and regional radio being undertaken in the Netherlands.

From Concertation to Consensus
UNESCO, 7 Place de Fontenoy, 75700 Paris, France; 198pp; 1979; free.
A collection of speeches by Mr. Amadou-M'Bow, UNESCO's Director General, addressed to the twentieth session of the General Conference held in Paris during October/November 1978. They give an outline of all the issues with which UNESCO is concerned.

International Yearbook of Educational and Instructional Technology
The Association for Programmed Learning and Education Technology, c/o Middlesex Polytechnic, Bounds Green Road, London N11; every two years.
Any reader of *InterMedia* whose work falls within the general field of educational and instructional technology and wishes to have their organisation listed free of charge in the above yearbook is invited to send the relevant information to Ms Anne Howe, Editor, International Yearbook of Educational and Instructional Technology, Learning Systems Group, Middlesex Polytechnic, Bounds Green Road, London N11, UK. The entry should be between 100 and 250 words and give details of the name, address, name of contact where possible and brief notes on the aims, activities and publications of the organisation.

ITV: A User's Guide to the Technology
by Herbert S. Dordick, Helen G. Bradley and Glen Fleck
Corporation for Public Broadcasting, 1111 16th Street NW, Washington, DC 20036, USA; 95pp; 1979; $4.95.
A guide book designed to enable educators and those in public television stations to select alternative ways of distributing instructional television to schools and colleges. Some options include the use of video, satellites and cable.

Making News
by Gaye Tuchman
Collier Macmillan Limited, Stockley Close, Stockley Road, West Drayton, Middlesex, UK; 244pp; 1978; ISBN 0 02 932930 2; £9.75.
An excellent account, part anecdote and part analysis, of the making of news (or, as the author puts it, 'the social construction of reality').

Media, Politics and Culture: A socialist view
edited by Carl Gardner
Macmillan Press, 4 Little Essex Street, London WC2, UK; 197pp; 1979; ISBN 0 333 23589 4; £3.95.
A collection of articles providing an overview of the various strategies for the socialist transformation of the media. The latter half of the book discusses the question of democracy and media in a post capitalist society.

Michigan State University, Rockford:Two-Way Cable Project: System Design, Application, Experiment and Public Policy Issues
Department of Telecommunication, Michigan State University, East Lansing, Michigan, USA; 1978; price on application; in three volumes.
The three volumes describe the development and implementation of a two-way interactive cable television communication system and the effect

it would have upon urban administration. Volume I contains a summary, Volume II contains the full report and Volume III, entitled *Minicomputer System Software*, contains all the computer programme documentation.

The Movie Brats
by Michael Pye and Lynda Miles
Faber & Faber, 3 Queen Square, London EC1, UK; 273pp; 1979; ISBN 0 571 113834; £5.25.
An informed and journalistic account of how six young successful directors (Francis Coppola, George Lucas, Brian de Palma, John Milios, Martin Scorsese and Steven Spielberg) have managed to manipulate Hollywood's power and wealth to make some movies as they wanted to make them; the results include *The Godfather*, *Star Wars*, *Jaws*, and *Close Encounters of the Third Kind*.

Multinational Corporations and the Control of Culture
by Armand Mattelart
Harvester Press Limited, 17 Ship Street, Brighton, Sussex, UK; 310pp; 1979; ISBN 0 85527 851 X; £14.95.
A frank investigation into the strength and power built up by a few American-based multinational companies; and how they control or influence the media.

National Communication Policy Councils
by Marco Dias, John Lee, Kaarle Nordenstreng and Osmo Wiio.
UNESCO, 7 Place de Fontenoy, 75700 Paris, France; 44pp;ISBN 92 3 101661 X; free.
Another publication by UNESCO in its series on communications systems and policies throughout the world. This book examines the experiences of Brazil in *Public Participation, the Challenge Facing the New Communication Council* and of Finland in *Roles and Functions of a Communication Policy Council*.

The New Penguin Dictionary of Electronics
by Carol Young
Penguin Books Limited, 12 Grosvenor Gardens, London SW1, UK; 618pp; ISBN 0 7139 1178 6; £7.95.
A useful collection of terms used in electronics research and industry.

Outside Interference
by Richard Harding
Sun Books, Macmillan, 107 Moray Street, South Melbourne, Victoria 3205, Australia; 219pp; 1979; hardback ISBN 0 7251 0314 0, paperback 0 7251 0315 9; £6.95.
The author, a professor of law and former member of the Australian Broadcasting Commission, gives a lively, detailed and well-informed account of the ABC since 1972. He documents how the Labour and then the Liberal-Country coalition governments both, by quite different policies, lessened the independence of the ABC; and he makes a powerful argument for greater democracy and diversity.

Radiodifusion y Television
Ministerio de Cultura, Avenida del Generalismo 39, Madrid, Spain; 98pp; 1978; ISBN 84 7483 004 4; free.
Handbook on the organisation and objectives of broadcasting in Spain.

Television, Censorship and the Law
by Colin R. Munro
Saxon House, Teakfield, 1 Westmead, Farnborough, Hampshire, UK; 194pp; ISBN 0 566 00176 4; £9.75.
A legal account of what can, and what cannot, be shown on UK television; well-informed and thorough.

The Toiling Word
by Graham Jones
International Press Institute in association with Friedrich Naumann Stiftung, 280 St. John Street, London EC1, UK; 114pp; 1979; ISBN 0 86194 031 8; Sw. Fr. 25.00.
A revealing study of the 'poor press' in India, based on an IPI-FNS seminar held at Agra in December 1978. The book contains a wide selection of original material, and examines in detail the problems facing the press in rural areas.

The Unknown Audience
by Patricia Edgar and Ursula Collins
Centre for the Study of Educational Communication and Media, School of Education, La Trobe University, Bundoora, Victoria 3083, Australia; 100pp; 1979; ISBN 0 85816 210 5; free.
A study of the programme choices of children aged 9-15 and their responses when shown a selection of programmes produced specifically for children in the UK, USA and Canada. An important find was that there is considerable potential for foreign children's programmes in the Australian market.

Videoconferencing Via Satellite: Opening Congress to the People
by Fred Wood, Vary Coates, Robert Chartrand and Richard Ericson
Programme of Policy Studies in Science and Technology, The George Washington University, Washington, DC, 20052, USA; 60pp; 1979; free.
Final report of some research on whether satellite videoconferencing could provide two way communications between congressmen and constituents and thus strengthen the legislative process.

World Communications: Threat or Promise?
by Colin Cherry
John Wiley and Sons Limited, Baffins Lane, Chichester, Sussex, UK; 230pp; 1979; IBN 0 471 99616 5; £11.00.
A second edition (with updated statistics) of this general introduction to communications.

European Intellectual Property Review
ESC Publishing Limited, 14 Suffolk House, 263/5 Banbury Road, Oxford, UK; monthly; ISSN 0142 0461; £85.00 per year.
A new review providing up-to-date information on all aspects of intellectual property. Each issue contains articles, a European Case Digest with useful notes on recent legal decisions and news within Europe, a section on news and events and a case comment.

Legal Service Bulletin
Faculty of Law, Monash University, Clayton, Victoria 3168, Australia; every two months; $16.00.
The 1979:4 issue contains two informative, authoritative accounts of the recent public inquiries into the renewal of some Australian commercial television licences. The hearings were conducted by the Australian Broadcasting Tribunal, and were the country's first. They were confused and controversial.

Television and Home Video
Link House Publications, Robert Rogers House, New Orchard, Poole, Dorset, UK; monthly; £7.80 p.a.; 50p single copies.
Many glossy magazines have emerged on the backs of the successful domestic marketing of the VHS and Sony video cassette players. This monthly is one of the best; it deals with home video and all related matters.

Third World Quarterly
Third World Foundation, New Zealand House, 80 Haymarket, London SW1, UK; quarterly; £10.00 pa, £3.00 single copies.
The July 1979 issue contains a substantial article, 'The Free Flow of Information: Myths and Shibbuleths', by Altaf Faufar, editor of the quarterly (and founder of Pakistan TV) which provides a wide-ranging analysis of 'free flow' and related issues.

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International Index to Television Periodicals
90-94 Shaftesbury Avenue, London W1, UK; approx. 100 cards; new cards despatched every ten days; £150.
A new indexing service (son of an index to film magazines) which is designed to offer researchers a quick guide to the contents of various selected television periodicals (of which *InterMedia* is one). Main topics are TV programmes, and programme news and reviews. Too sketchy and too expensive to have much value to individuals, although libraries might find it useful.

WHO'S IN CHARGE?

It's often said that television has no history. All the programmes, even the most famous, are only flickers on a phosphor screen. A TV station might have a master copy of its favourites, but the people who watch have little chance of access to the original. The first television programmes were live, and not recorded. Many of the programmes of the sixties and seventies, which were made on videotape, have been scrapped or are simply not repeated.

One exception to this rule is Mexico, where the Televisa organisation has given over its Channel 4 to the showing of old programmes. Starting on the morning of 23 July, the network is screening over 40,000 hours, 10 hours a day, of news, special events, entertainment and films selected from the past twenty years. ('Today, Televisa goes back 20 years in search of tomorrow', says its advertisement.)

Televisa isn't only looking to the past. On the same morning that Televisa's Channel 4 started its repeats, the company's second World Encounter on Communication started its five days of analysis and discussion. The Encounter was inaugurated by José Lopez Portillo, president of Mexico. Its aim was to explore the future of television.

It was appropriate that the Encounter was held in Mexico, and opened by the president. In the past few years (coinciding with J.L. Portillo's presidency) Mexico has come to take a more explicit and more subtle position in the affairs of the world. The most obvious symbol of this new status is the courtesy and mutual appreciation between Mexico and the USA; and the trigger for that, not wholly welcome to the USA, is Mexico's discovery of vast oil reserves in the Gulf of Mexico.

It is predictable, sad and unfortunate that, even so, Mexico hardly features in the North American and European press. In June and July the press got excited a little when the Ixtoc oil well exploded, but it devoted real coverage only when the oil slick endangered the US coast (the brunt of the first BBC news report of this danger was the wonders of US technology in keeping the oil away from the tourists).

Expanding and ambitious

Mexico's 60 million people deserve better treatment. The country's oil discoveries (the oil business, incidentally, has been nationalised for years) are only one aspect of a society that is rapidly expanding, that is ambitious, and that is making increasingly substantial contributions both to the Pacific region and to the world. The series of the Encounters (the first was held in 1974, and there are likely to be more) is an integral part of this articulation of the new Mexico. It is, of course, exceptionally rare for a broadcasting organisation to hold such an event; and generous, too.

The Encounter had three streams. Televisa described them as the 'operational', the 'humanistic' and the 'technological'. In the mornings, policy-makers and broadcasting executives presented models of their national TV and radio organisations. In the afternoons the time was split between 'The Age of Television', chaired by Wilbur Schramm, and 'The Technological Revolution', chaired by Jorge Kanahuati, Televisa's own general vice-president of operations.

The national models were presented in a style that can best be described as official – the senior executives described how their organisations behaved, the politicians described the aims that they sometimes did not achieve. The sessions on 'The Age of Television' were philosophical, both in the old sense of exhibiting a love of knowledge and in the vernacular sense of being calm in the face of great difficulties. The difficulty, in the words of Robert Lindsay, was that academics are 'groping in the dark'. The technology sessions were more informal; a provocative mix of the business-like and the speculative. Into this three-ring Encounter were pitched over fifty presentations: an impassioned plea by Octavia Paz for more diversity in communications, an analysis of TV and baseball, a remarkable analysis of UK broadcasting by David Webster and Sir Denis Forman, and much, much more.

At the end of the week, the humanists and technologists (to take Televisia's epithets), who had met in parallel sessions, were mutually curious about each other's discussions. They suspected that the same topics were being discussed in a different way. They were right. While the technologists were enthusing over the Prestel videotex service and Warner's Qube interactive service, the academics and humanists were criticising television's power to distort and make banal. The 'curse of instantaneity' was one academic's reaction to Qube. Where technologists saw opportunities, the academics saw problems.

Satellites in Mexico

The range of different attitudes was most clearly revealed in the discussions about satellites. Mexico has a great interest in satellites; both domestic and international. The participants at the technology sessions were avid for information, of all kinds, about space technology, about the mechanics of launching and control, about regulation and law, about costs and timings. The mood was expansionist and optimistic. The questions were how, when, how much?

Why? was left to the humanists. They did not focus on satellites, or any other single technology, as much as did the technologists themselves. But they did deal thoroughly with the meanings and implications. Their mood was conservative, passive.

It was interesting to witness that the academics were much more curious about the new technologies than were the technologists about the new (or old) academic research. The technologists were working within a context that did not have much room for sociological research, whereas the researchers' context encompassed a much wider range of activity. However, it is not really true to say that the researchers therefore had a monopoly of intellectual speculation. Rather, the reverse. The businessmen speculated while the humanists and researchers asserted and argued.

Outside the Encounter they will continue their business of commerce and research, in a world in which television itself and television's new services are changing and expanding at ever increasing rates and in quite new directions. Often the market-place is left to decide the fortunes of these new services (eg, US domestic satellites. Prestel).

Should anyone be in charge of these myriad happenings? Most participants at the Encounter thought not; they saw positive virtues in competition. But some people believed the market-place to be inefficient and wasteful. It's notable that no country can really claim to have a constituency, a consensus of support, for the new services that are being introduced.